A REPORT ON
MAGNETIC SURVEYS OF ULTRAMAFIC BODIES
IN THE
DOVER, WINDHAM, AND LUDLOW AREAS, VERMONT

By

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WESTON GEOPHYSICAL ENGINEERS, INC.

for the

VERMONT GEOLOGICAL SURVEY

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WATER RESOURCES DEPARTMENT
MONTPELIER, VERMONT

ECONOMIC GEOLOGY NO. 1

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PREFACE

This initial report of the new economic geology series of the Geological Survey was made possible largely by the results of the systematic basic mapping program which produced the Centennial Geologic Map of Vermont. Reports in this series are concerned with areas having possible economic potential, including those cited in the older geological literature and meriting evaluation. In the light of modern technological skills and advances in the methods of geological exploration, and the new geological knowledge of the state, it is now time for a revival of interest in the appraisal of promising localities. Investigations are based upon the known geology and comprise the application of geophysical and geochemical methods suitable to the geologic conditions of a locality.

The Geological Survey has plans to continue and place greater emphasis on such a program and to publish the results. It is hoped that these reports will interest industry sufficiently to induce it to continue additional explorations which might lead to its establishment in the state. Mining companies are interested in areas in the state demonstrating economic possibilities. What is needed is the necessary geologic information which this program is designed to provide.

CHARLES G. DOLL
State Geologist

REPORT ON MAGNETIC SURVEYS IN THE DOVER AND WINDHAM AREAS, WINDHAM COUNTY, VERMONT

By

VINCENT J. MURPHY

WESTON GEOPHYSICAL ENGINEERS, INC.

Introduction

During the recently completed geologic mapping program of the Vermont Geological Survey, limited geophysical field studies disclosed magnetic anomalies warranting further study.

An agreement was entered into between the Geological Survey and Weston Geophysical Engineers, Inc., to conduct magnetic surveys in specified areas near Dover, Vermont, in the hope that such anomalies might be related to mineral deposits of economic value.

Dr. Charles G. Doll, Vermont State Geologist, and Mr. Vincent J. Murphy of Weston Geophysical Engineers, Inc., made several field inspections to establish an economical and effective reconnaissance exploration program. It was decided that a specified number of magnetic traverses should be conducted over several geologic horizons where either abandoned iron mines or ultramafic rock masses are located. Other adjacent areas were also to be investigated in the event that similar geologic features existed which could not have been observed during the geological field mapping program. The known occurrences of magnetic minerals in the mine areas, and the anticipated occurrences along mineralized zones in the ultramafic areas, indicated that a magnetic survey was feasible.

Method of Study

The magnetic method of geophysical exploration establishes relative values of the earth's magnetic field throughout the area of interest. Similar readings resulting in a flat curve of the plotted results are obtained when no concentrations of magnetic minerals are present. Highly anomalous readings are obtained wherever a concentration of magnetic minerals exists. If the magnetic anomalies extend over a wide area, or if they can be traced for great longitudinal distances, a body of possible economic value is indicated.

The magnetic minerals are often of too small a quantity to have economic value, but they are in many instances associated with other minerals that are of value. The magnetic minerals therefore serve as indicators, and are readily detectable.

For this study, a magnetic level of approximately 1000 gammas indicates a smooth magnetic field condition free of anomalies. Wherever the values are in the range of 2000–4000 gammas, an anomalous condition exists. The width of an anomaly, in this study, indicates the approximate width of the buried concentration of magnetic minerals. The magnitude of the anomalies and the sudden transition from level values to highly anomalous values indicates geologic features that are very close to the ground surface.

Locations of Magnetic Stations

Magnetic stations were established along roads, trails and other features that facilitated locating them on U.S.G.S. topographic contour maps. Approximately 950 stations were occupied and generally spaced 200 feet

apart. In some instances, very close spacings were used to determine if anomalous data should be rejected; in other cases, distant spacings were necessary to avoid buildings, fences, etc. In the North Windham and South Windham areas closed magnetic traverses were operated to determine the continuity of the mapped ultramafic and to detect others that might exist at shallow depths.

Results of the Survey

Sections of the U.S.G.S. topographic maps of the areas under study were enlarged and the traverses indicated thereon. The locations of two or more stations for each traverse are also indicated on the maps. The remaining stations for each traverse can be located readily by use of the plan map data and the spacings of points shown on the magnetic profile for each traverse.

Magnetic station values for each traverse are plotted on the graph sections accompanying the report. Tabulations of these values are also included in the report in the event that a specific need for them arises.

Presentation of Data

Magnetic survey data can be displayed in a similar manner as topographic survey data; that is, by means of profiling and/or contouring. Although profiling is the preferred method for showing the existence and relative magnitude of the anomalies disclosed by this study, contour maps are helpful in showing the trend and extent of the anomalies.

Magnetic profiles and contour maps are therefore included for each of the several areas that were investigated. Wherever a large number of stations were occupied and cross-profiles or adjacent profiles exist, the data can be considered as very reliable and approaching the coverage of a highly detailed survey. They should be used with discretion, however, in areas where the profiles and contour maps are based on only a few or isolated stations.

Correlation with Known Geology

The type and amount of correlation of magnetic survey data with known geology depends primarily on the geographical extent and density of stationing. For studies where the magnetic traverses extend for hundreds of miles, definite inferences can be drawn regarding the depth of surface formations and the existence of deeply buried ones. In studies such as this survey, where the areas are limited in extent, the objectives are usually concerned with prospecting for economic minerals. The correlation with geology therefore exists in the explanation and evaluation of magnetic anomalies from an economic standpoint, and the correlation may be direct or indirect. It is direct if, for example, a magnetic ore body is known to exist and it is to be only detected and traced; it is indirect if the anomaly cannot be explained with certainty by surface geology but does have a logical explanation indicating further exploration by drilling. The anomalies disclosed by this study have, for the most part, indirect geological correlations.

Specific correlations of data are included in the following sections of this report which are concerned with individual areas and the anomalous magnetic conditions disclosed in each area.

For a detailed description of the geology of the Dover and Mt. Snow (Pisgah) areas see "The Green Mountain Anticlinorium in the Vicinity of Wilmington and Woodford, Vermont" by James W. Skehan, S.J., Bulletin No. 17, Vermont Geological Survey, 1961. The geology of the Windham areas is described in "Geology of the Southern Part of the Chester Dome, Vermont" by John Lang Rosenfeld: Ph.D. thesis, Harvard University, 1954.

North Windham and South Windham Areas

These two areas contain a few small exposures of ultramafic rocks. The anomalies on the North Windham traverse probably result from small, discontinuous ultramafic rock masses or localized unrelated concentrations of magnetic minerals.

The South Windham traverse is free of anomalies with one exception, the anomaly from station N-1 to N-13. This smooth magnetic feature indicates a possible ultramafic body at a depth of approximately 200 to 400 feet below ground surface.

The magnetic data throughout these two areas indicate that the Moretown formation is generally non-magnetic. Anomalies that have been detected within this formation are presumed due to magnetic mineral concentrations associated with very localized ultramafics. These exist close to ground surface except for the single instance noted in the preceding paragraph.

East Dover (South) Area

The data for this area again indicate a pattern of small, low-level anomalies for the Moretown formation as a whole. High-level anomalies exist at or in the vicinity of small, previously mapped ultramafics. Based on the extremely localized nature of these anomalies, we conclude that large buried ultramafic rock masses do not exist here and the map pattern of smaller zones is discontinuous.

East Dover (North) Area

The profile and contour data indicate conclusively that this area contains extensive zones with high concentrations of magnetic minerals. These exist near the contact areas of a large ultramafic rock mass which is shown on the map of the Wilmington-Woodford area

(Bull. 17, Vermont Geological Survey) and noted as the largest single exposure in the state.

A considerable amount of magnetic data over the ultramafic shows a low magnetic level similar to the adjacent rocks of the Moretown formation. It therefore appears that zones of magnetic minerals indicated by high-level anomalies are probably related to contact or structural phenomena and are not indicative of the ultramafic rock mass as a single formation.

The profile of magnetic traverse "J" is one worthy of special note. In the vicinity of stations J-15 and J-39 strong anomalous trends are indicated. These two positions are very close to the mapped contact areas and may help to more accurately establish the contact in the field. Profiles for the other traverses indicate similar anomalous conditions and positions of definite mineralization.

Mt. Snow (Mt. Pisgah) Area

The abandoned iron mines on the east side of Mt. Snow, noted on the geologic map of the Wilmington-Woodford area, are indicative of possible iron deposits in adjacent locales. The mines exist at or close to the contact of the Wilmington gneiss and the Heartwellville schist with a small zone of the Hoosac formation.

The magnetic data for this area indicate a few small anomalies, and high-level readings were obtained only in the working areas of the mines. Since the data do not display the anomalous character to be expected for large and extensive iron deposits, we have concluded that the deposits are very limited in extent and concentration.

The lack of anomalies likewise does not permit the definition of contact positions in the field for the above noted formations.

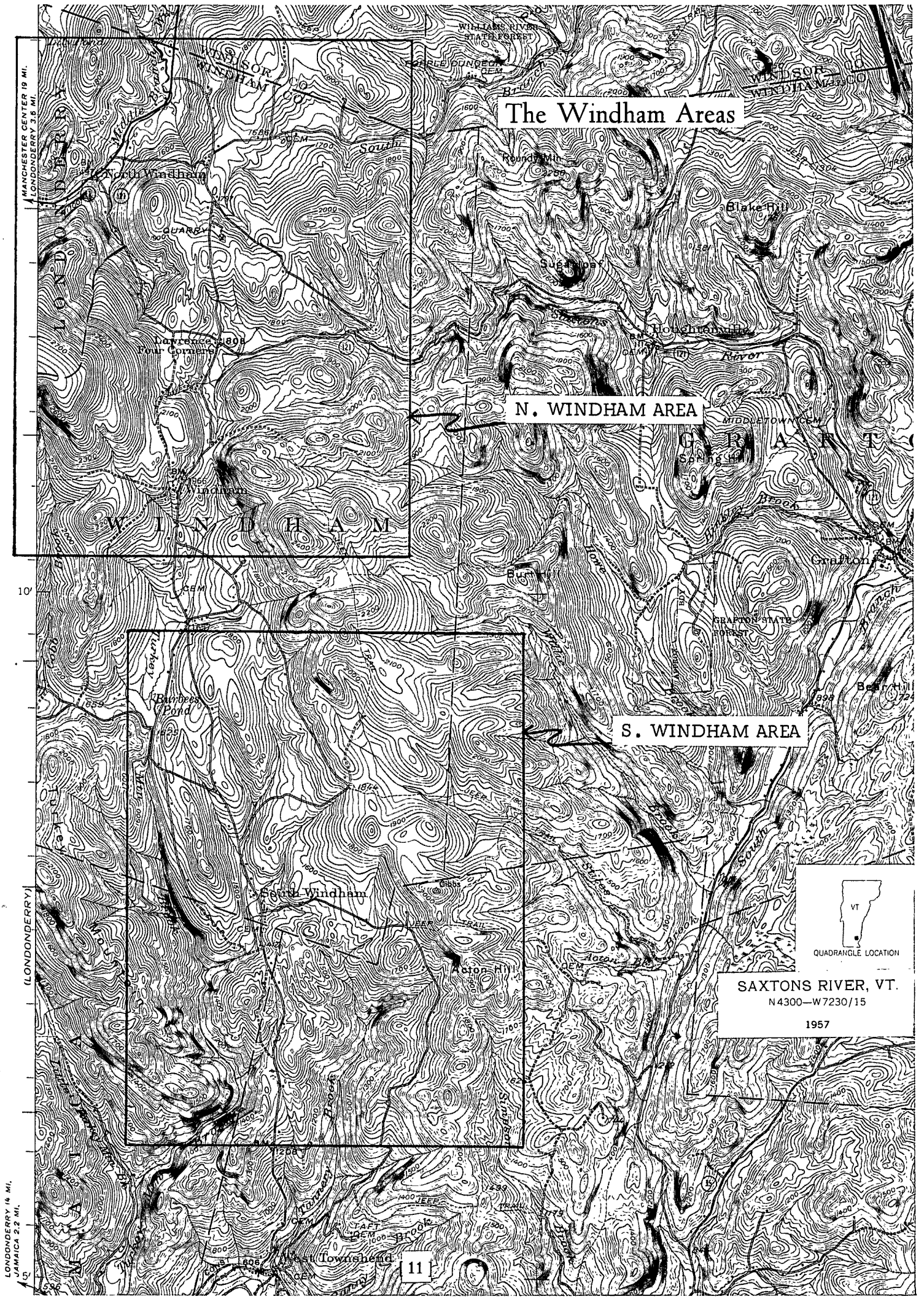
Economic Possibilities

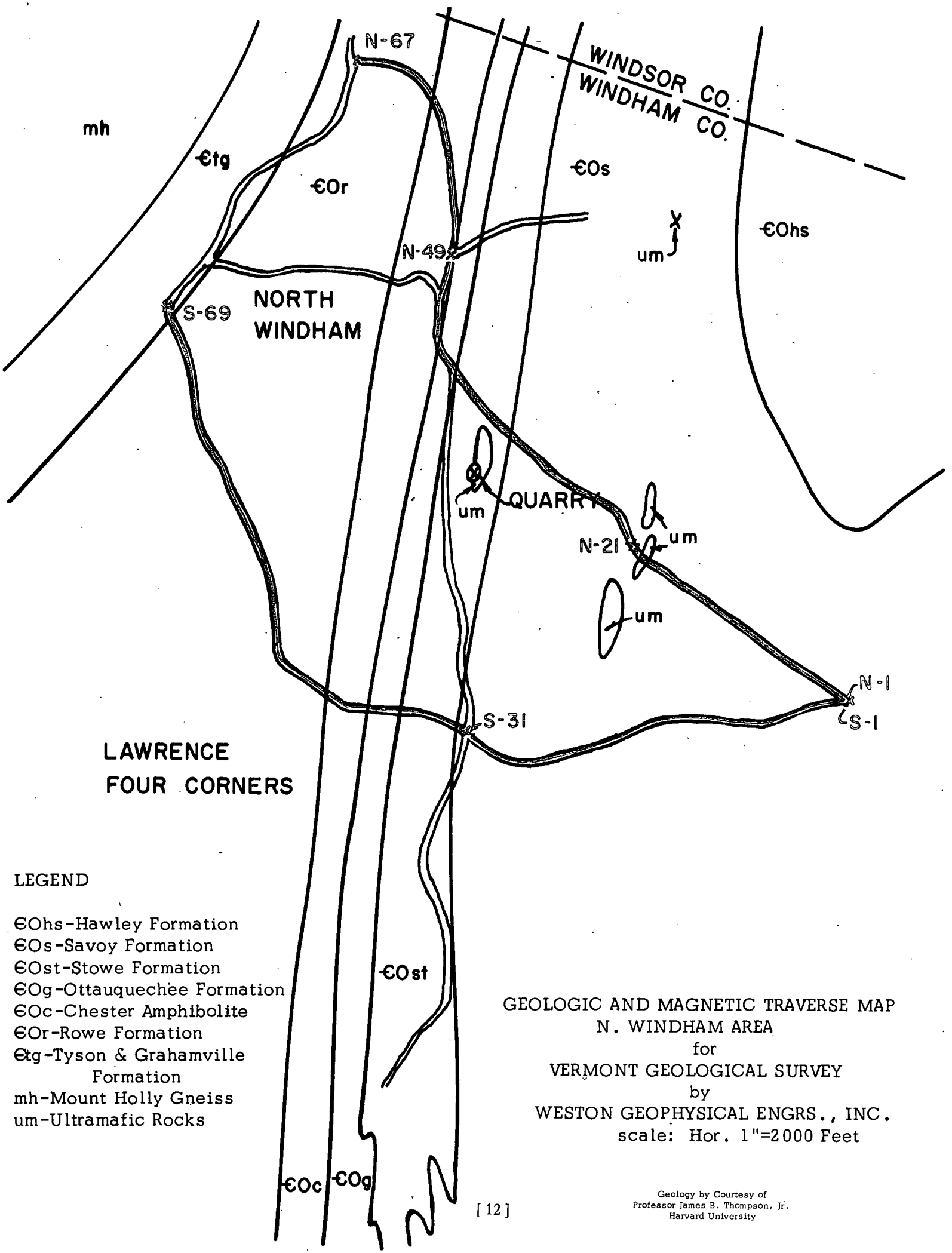
The only area which appears to have significant economic possibility is the East Dover (North) area. The anomalous magnetic readings in this area indicate high concentrations of magnetic minerals. The magnetic minerals in many instances are indicators of other mineral deposits suitable for exploitation.

Recommendations

Test borings in the vicinity of the magnetic anomalies in East Dover are advisable to determine if mineralization of economic significance is associated with the magnetic anomalies. The suggested positions for drilling are the vicinity of stations J-15 and J-39, and along the anomalous trends north and south of these stations.

In other locations additional and more detailed magnetic studies may prove helpful prior to drilling, to more accurately delineate anomalous trends. It is apparent, however, from the results of the present survey that no further magnetic studies will be necessary on the part of the Survey to disclose the existence and general location of anomalies.


The Windham Areas
N. WINDHAM AREA
S. WINDHAM AREA
WINDHAM CO
WINDSOR CO
WILLIAMS RIVER STATE FOREST
GRAFTON STATE FOREST
North Windham
Lawrence 1898
Four Corners
Windham
South Windham
Bamboo Pond
Acton Hill
Blake Hill
Sugarloaf
Roundy Hill
Houghtonville
Burnt Hill
Grafton
West Townshend
Bear Hill
MANCHESTER CENTER 19 MI.
LONDONDERRY 3.6 MI.
LONDONDERRY
LONDONDERRY 14 MI.
JAMAICA 2.2 MI.
VT
QUADRANGLE LOCATION
SAXTONS RIVER, VT.
N4300—W7230/15
1957
11

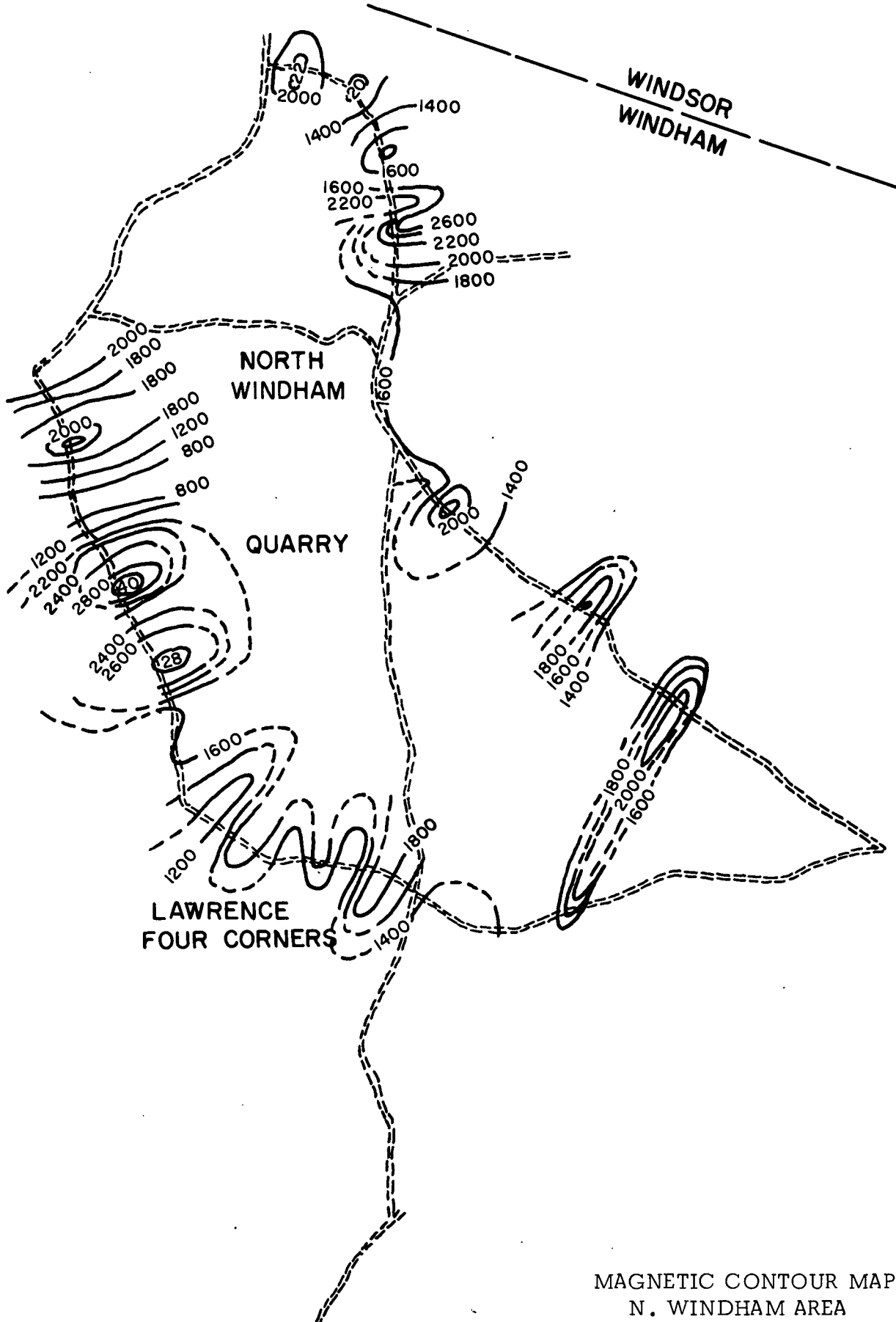


LEGEND

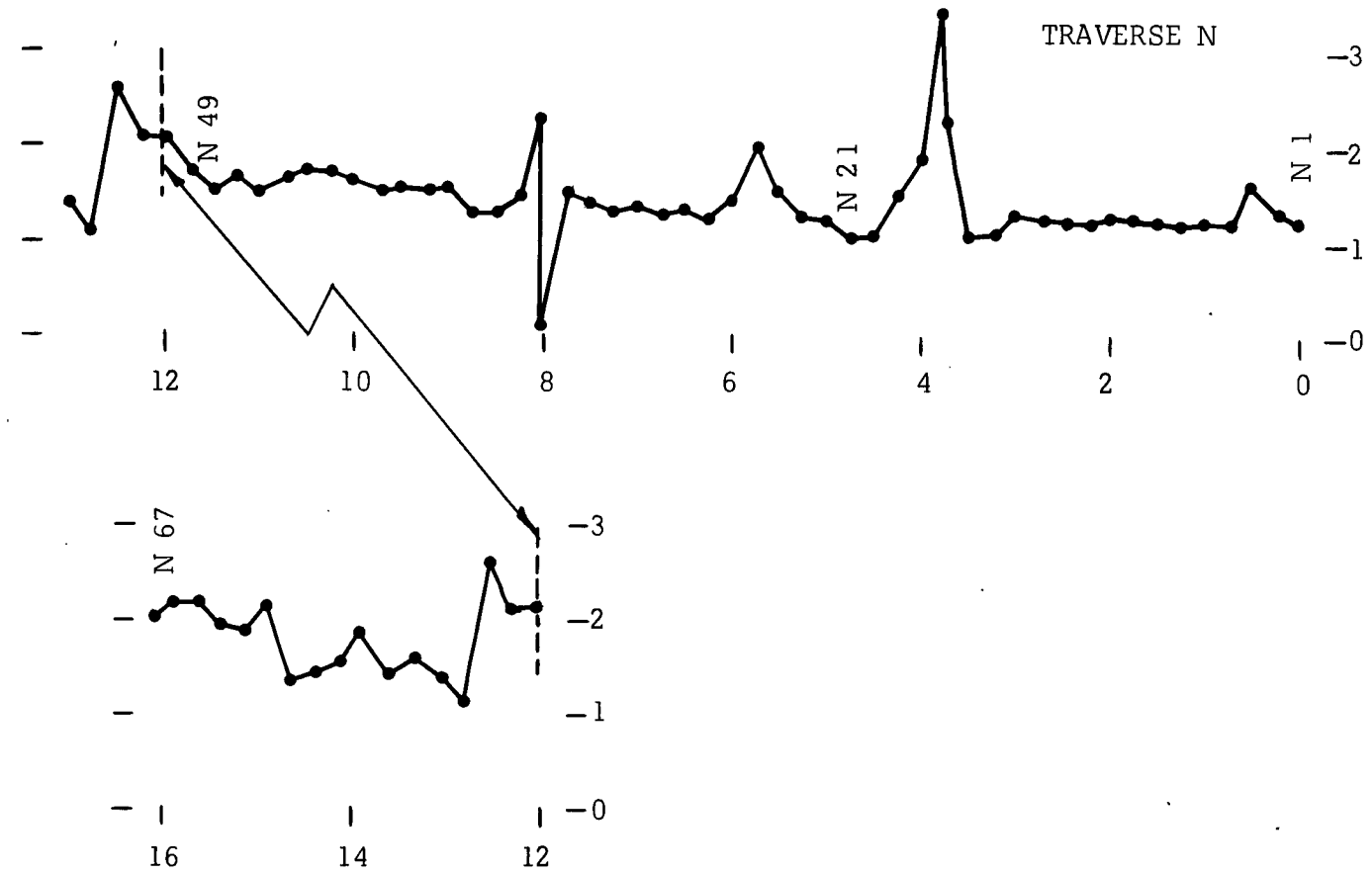
EOhs-Hawley Formation
EOs-Savoy Formation
EOst-Stowe Formation
EOg-Ottauquechee Formation
EOc-Chester Amphibolite
EOr-Rowe Formation
Etg-Tyson & Grahamville Formation
mh-Mount Holly Gneiss
um-Ultramafic Rocks

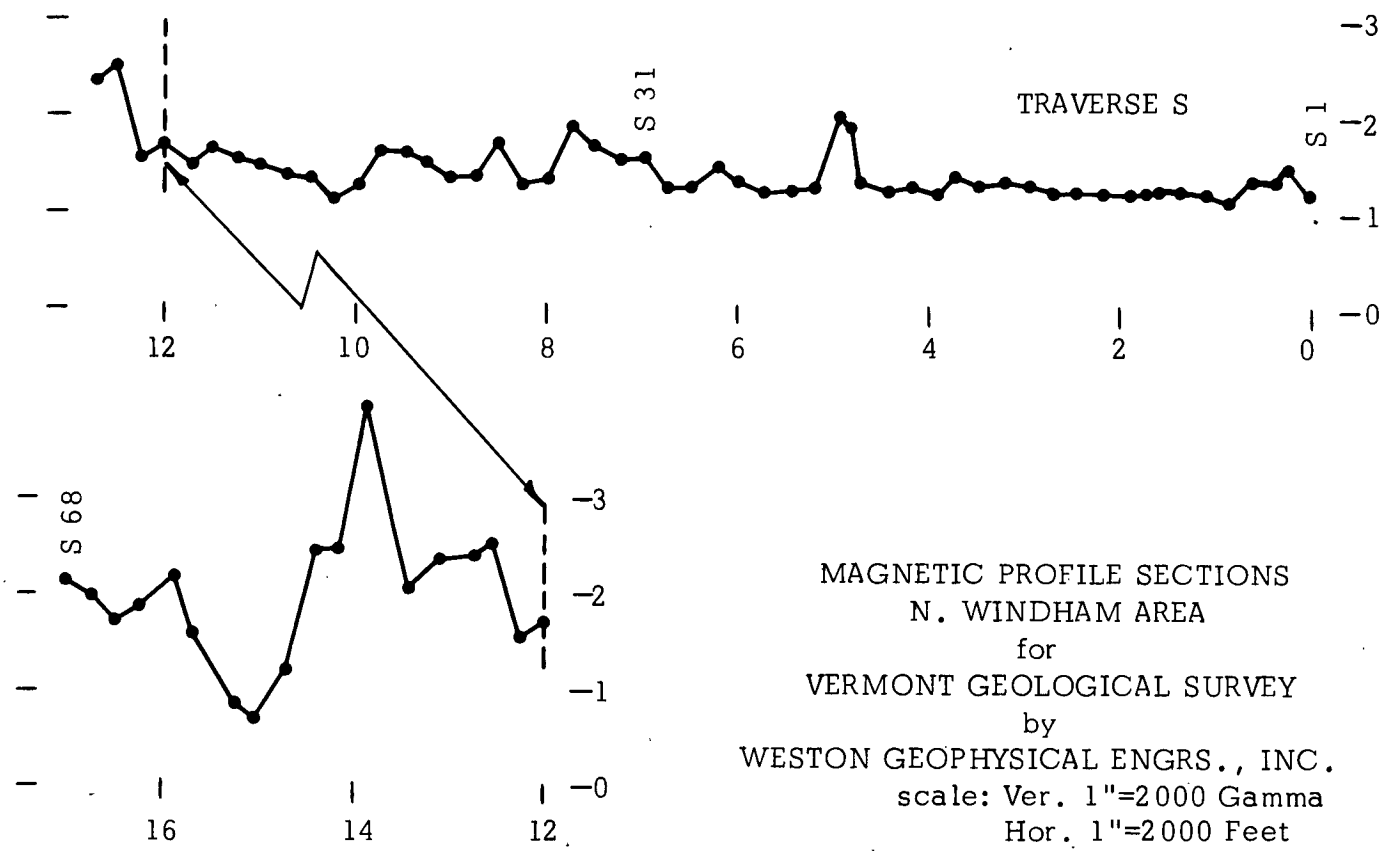
GEOLOGIC AND MAGNETIC TRAVERSE MAP
N. WINDHAM AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Hor. 1"=2000 Feet

Geology by Courtesy of
Professor James B. Thompson, Jr.
Harvard University



MAGNETIC CONTOUR MAP
N. WINDHAM AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
contour interval as indicated
scale: 1"=2000'





MAGNETIC PROFILE SECTIONS
N. WINDHAM AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

N. WINDHAM AREA

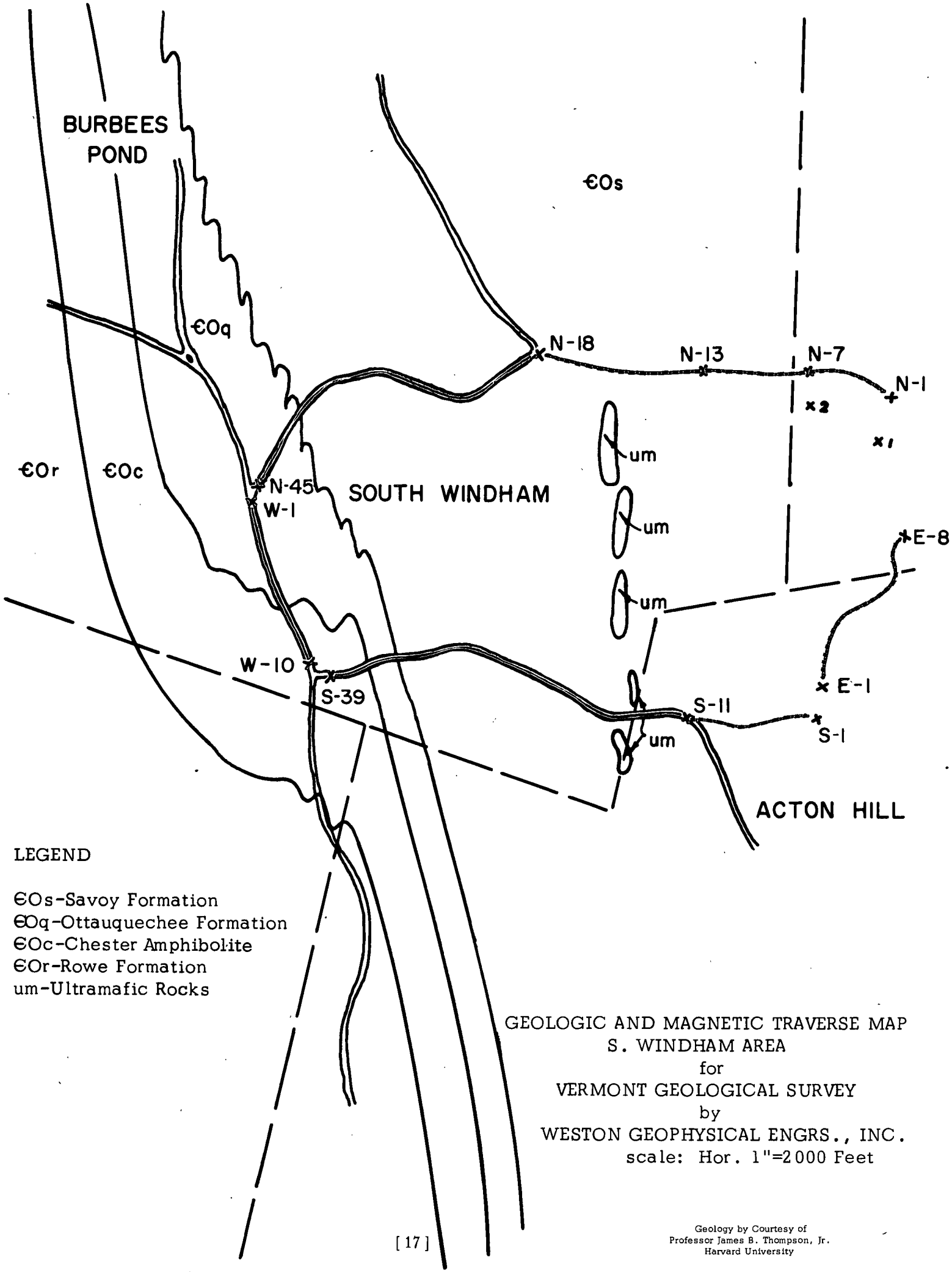
NORTH TRAVERSE

STATION	GAMMAS	STATION	GAMMAS
N-1	1230	36	1450
2	1350	37	1300
3	1650	38	1310
4	1210	39	1570
5	1225	40	1535
6	1210	41	1550
7	1245	42	1540
8	1265	43	1610
9	1275	44	1755
10	1230	45	1730
11	1280	46	1650
12	1290	47	1540
13	1300	48	1650
14	1090	N-49	1510
15	1055	50	1740
16	2310	51	2100
17	3440	52	2100
18	1845	53	2660
19	1410	54	1070
20	1080	55	1410
21	1080	56	1590
22	1260	57	1410
23	1305	58	1860
24	1590	59	1580
25	2070	60	1490
26	1440	61	1360
27	1220	62	2160
28	1330	63	1900
29	1310	64	1940
30	1345	65	2180
31	1320	66	2180
32	1390	N-67	2020
33	1525		
34	100		
35	2340		

N. WINDHAM AREA

SOUTH TRAVERSE

STATION	GAMMAS	STATION	GAMMAS
S-1	1230	35	1330
2	1450	36	1300
3	1370	37	1730
4	1360	38	1370
5	1170	39	1380
6	1240	40	1500
7	1240	41	1660
8	1270	42	1625
9	1260	43	1270
10	1245	44	1160
11	1240	45	1320
12	1240	46	1400
13	1260	47	1440
14	1300	48	1560
15	1340	49	1680
16	1340	50	1440
17	1420	51	1700
18	1220	52	1520
19	1300	53	2570
20	1270	54	2370
21	1360	55	2400
22	1900	56	2030
23	2070	57	4000
24	1240	58	2520
25	1250	59	2460
26	1200	60	1200
27	1320	61	690
28	1430	62	880
29	1280	63	1550
30	1270	64	2210
S-31	1540	65	1860
32	1570	66	1710
33	1700	67	2020
34	1940	S-68	2130



LEGEND

€Os-Savoy Formation
€Oq-Ottauquechee Formation
€Oc-Chester Amphibolite
€Or-Rowe Formation
um-Ultramafic Rocks

GEOLOGIC AND MAGNETIC TRAVERSE MAP
S. WINDHAM AREA
for
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scale: Hor. 1"=2000 Feet

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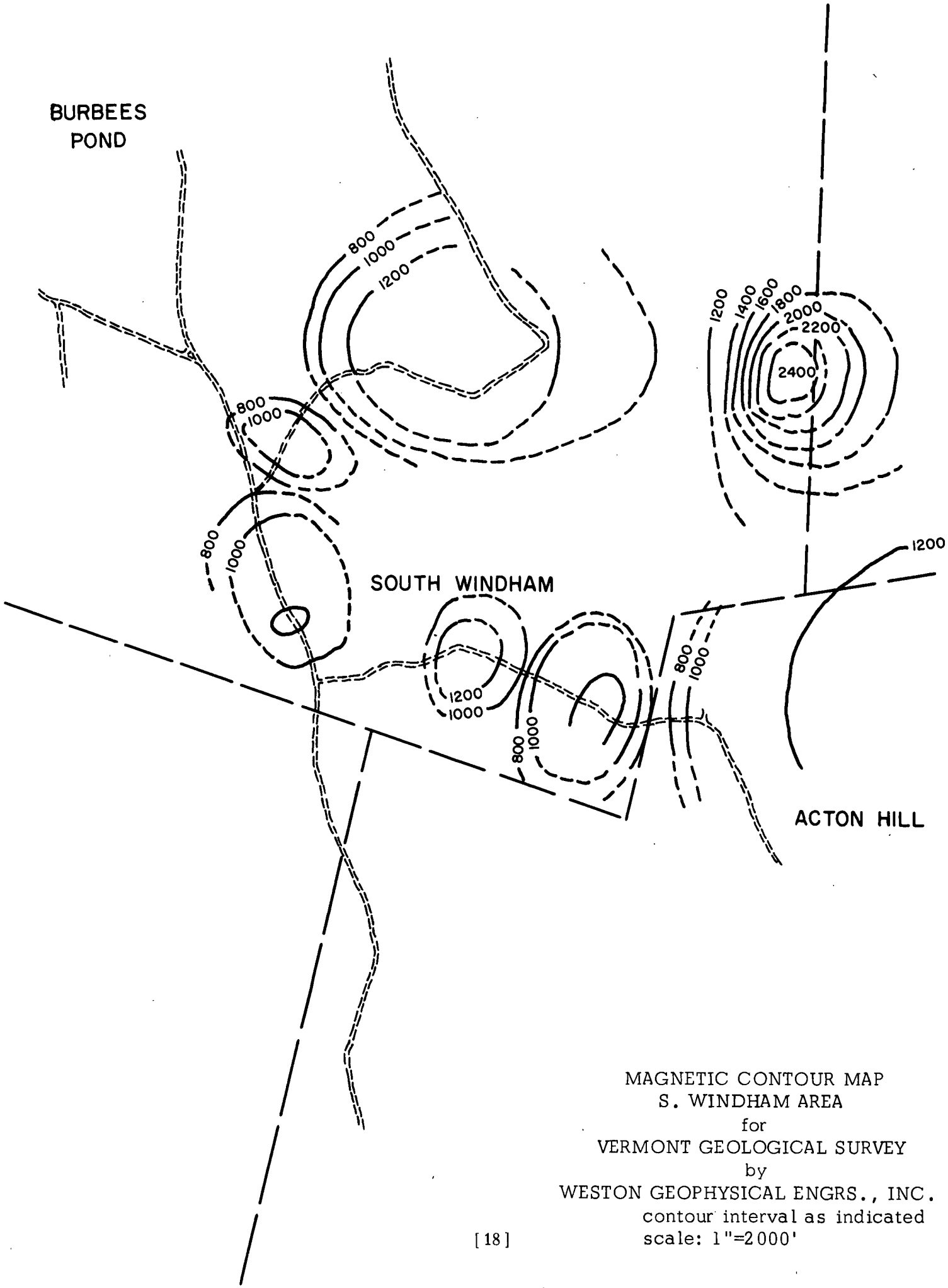

MAGNETIC CONTOUR MAP
S. WINDHAM AREA
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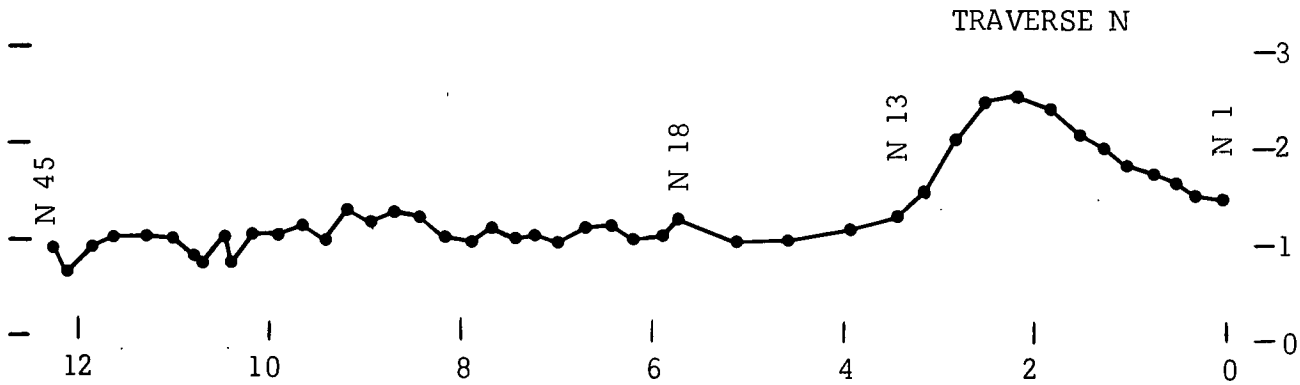
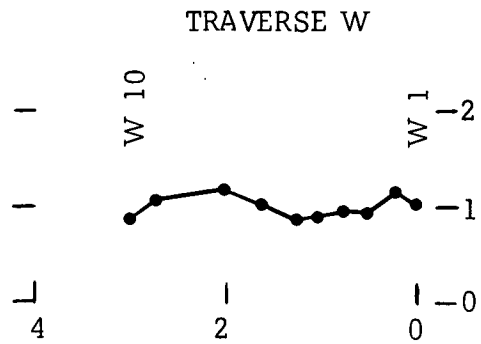
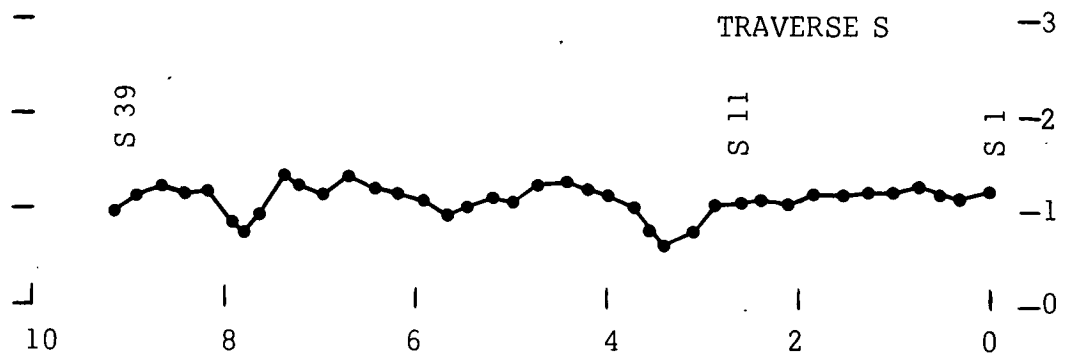
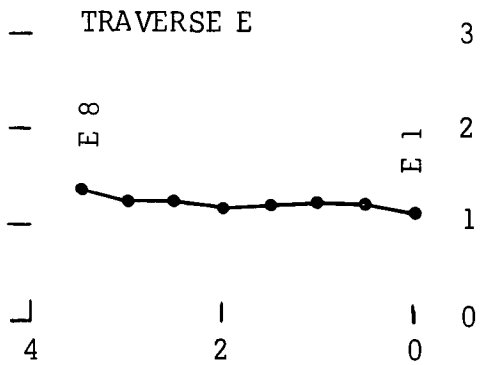
scale: 1"=2000'









MAGNETIC PROFILE SECTIONS
S. WINDHAM AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

S. WINDHAM AREA

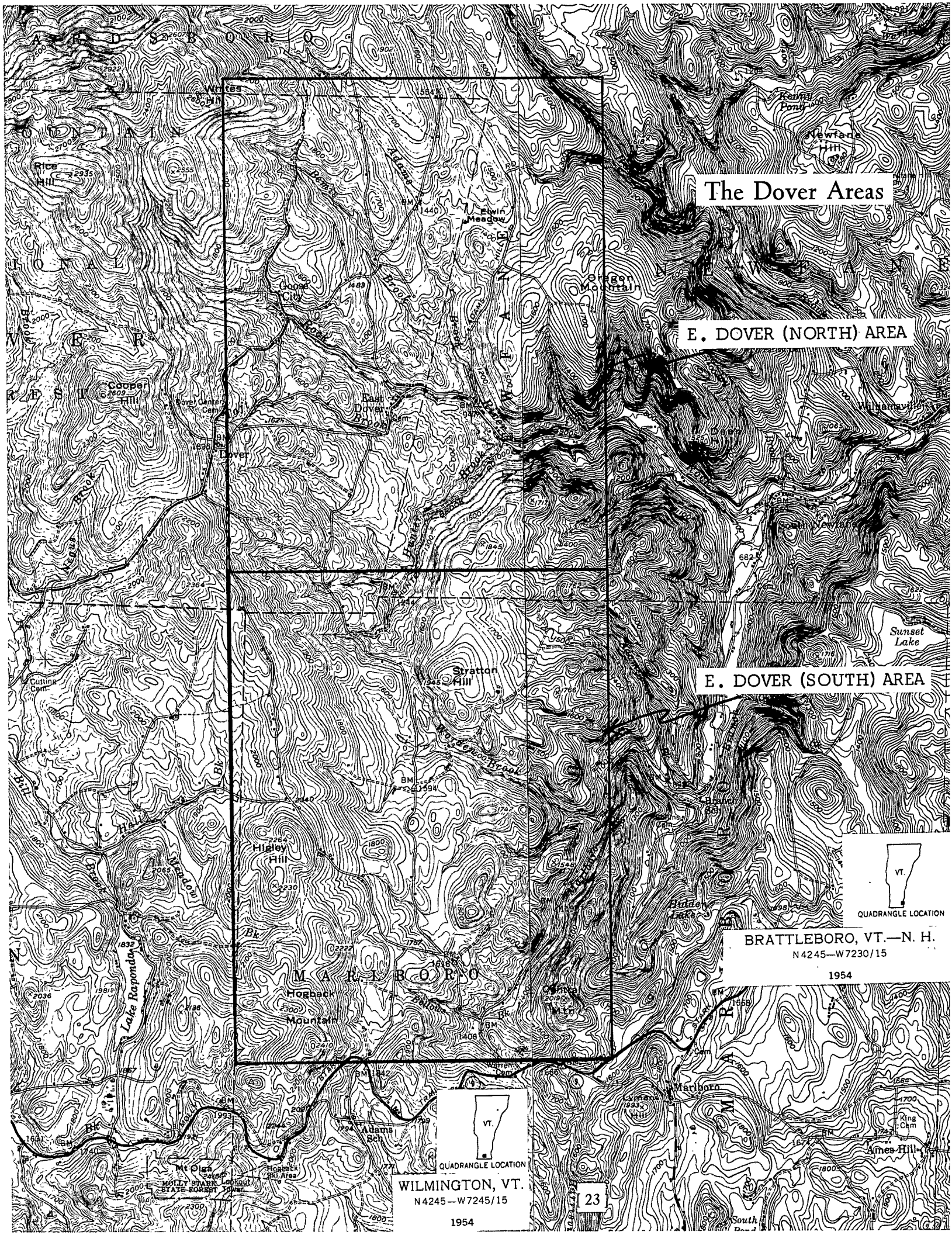
NORTH & WEST TRAVERSES

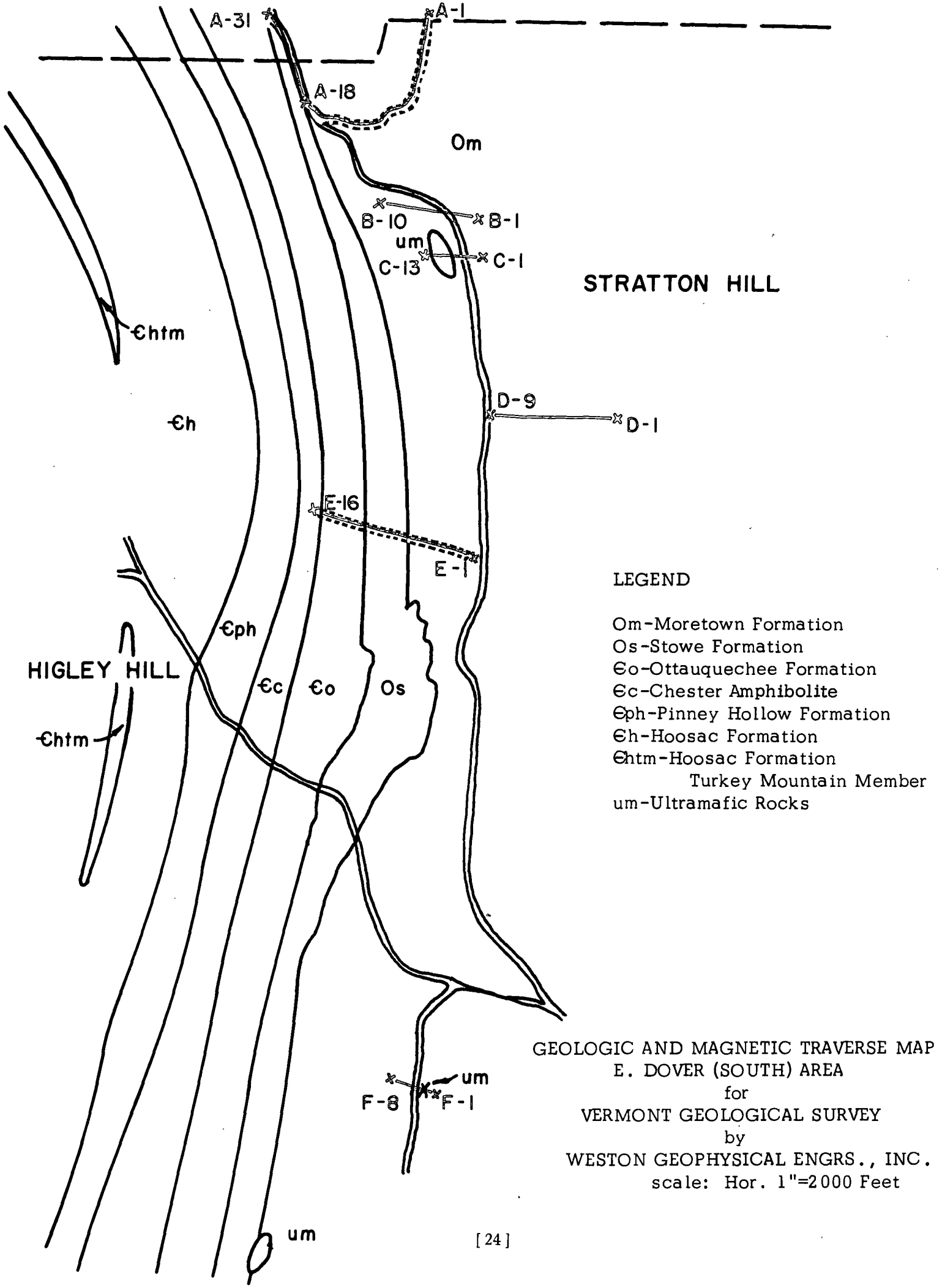
STATION	GAMMAS	STATION	GAMMAS
N-10	1430	29	1330
2	1500	30	1245
3	1640	31	1350
4	1760	32	1010
5	1840	33	1175
6	2050	34	1095
7	2140	35	1100
8	2410	36	760
9	2560	37	1105
10	2500	38	780
11	2160	39	870
12	1540	40	1030
N-13	1290	41	1045
14	1170	42	1030
15	1025	43	970
16	1065	44	600
17	1270	N-45	980
N-18	1080		
19	1050	W- 1	1030
20	1200	2	1130
21	1160	3	960
22	1010	4	970
23	1070	5	930
24	1055	6	910
25	1140	7	1080
26	1070	8	1200
27	1100	9	1070
28	1280	W-10	890

S. WINDHAM AREA

SOUTH AND EAST TRAVERSES

STATION	GAMMAS	STATION	GAMMAS
S-1	1200	26	1180
2	1130	27	1240
3	1170	28	1320
4	1240	29	1065
5	1200	30	1175
6	1190	31	1380
7	1160	32	980
8	1130	33	760
9	1070	34	850
10	1110	35	1200
S-11	1100	36	1190
12	1030	37	1240
13	790	38	1160
14	620	39S	980
15	670		
16	1050	E-1	1190
17	1145	2	1230
18	1250	3	1250
19	1300	4	1240
20	1250	5	1200
21	1070	6	1240
22	1140	7	1260
23	1090	E-8	1375
24	930		
25	1090	X 1	1330
		X 2	2010

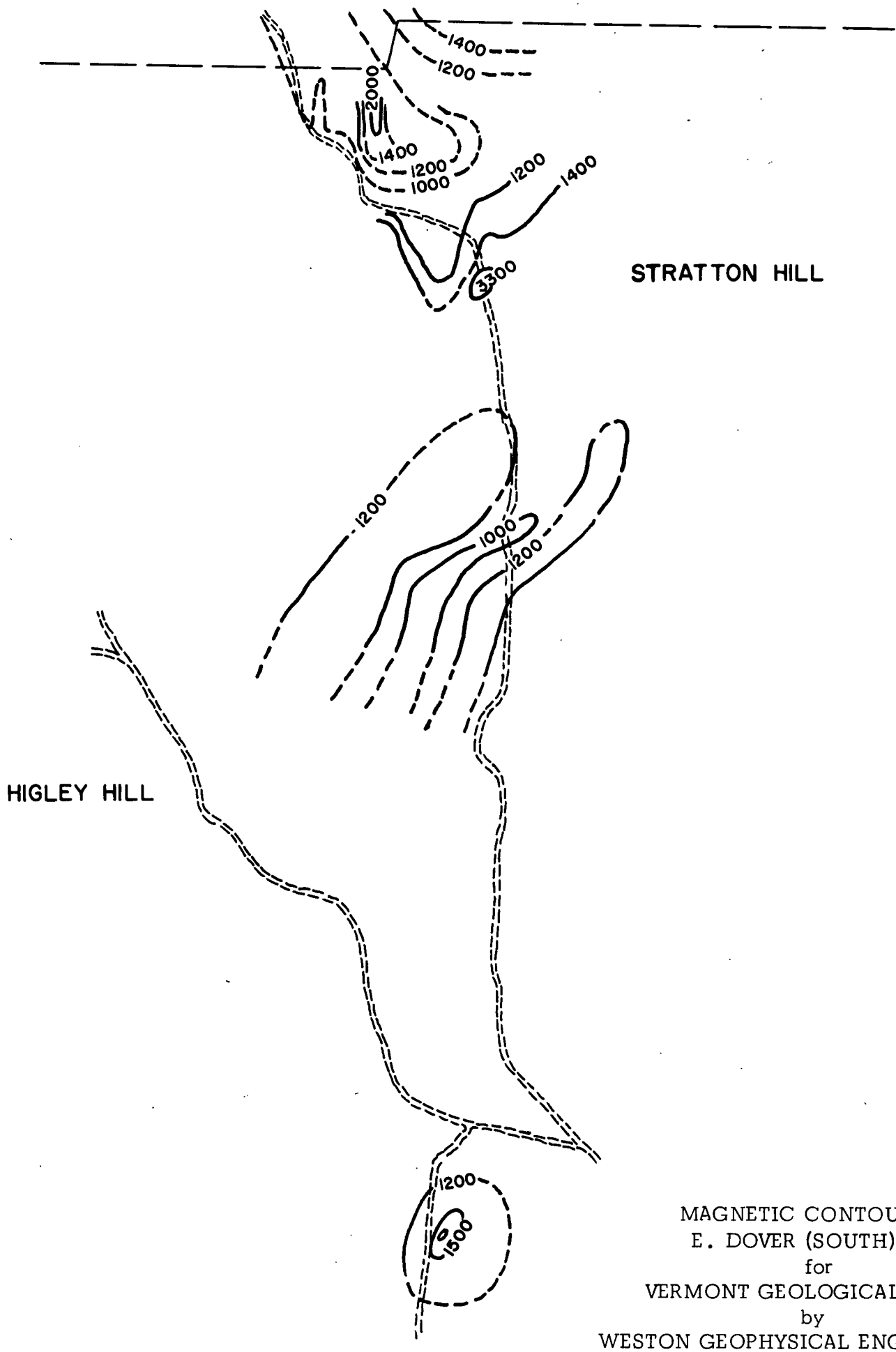

The Dover Areas
E. DOVER (NORTH) AREA
E. DOVER (SOUTH) AREA
VT.
QUADRANGLE LOCATION
BRATTLEBORO, VT.—N. H.
N4245—W7230/15
1954
VT.
QUADRANGLE LOCATION
WILMINGTON, VT.
N4245—W7245/15
1954
23



LEGEND

Om-Moretown Formation
Os-Stowe Formation
Eo-Ottauquechee Formation
Ec-Chester Amphibolite
Eph-Pinney Hollow Formation
Eh-Hoosac Formation
Ehtm-Hoosac Formation
Turkey Mountain Member
um-Ultramafic Rocks

GEOLOGIC AND MAGNETIC TRAVERSE MAP
E. DOVER (SOUTH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Hor. 1"=2000 Feet



MAGNETIC CONTOUR MAP
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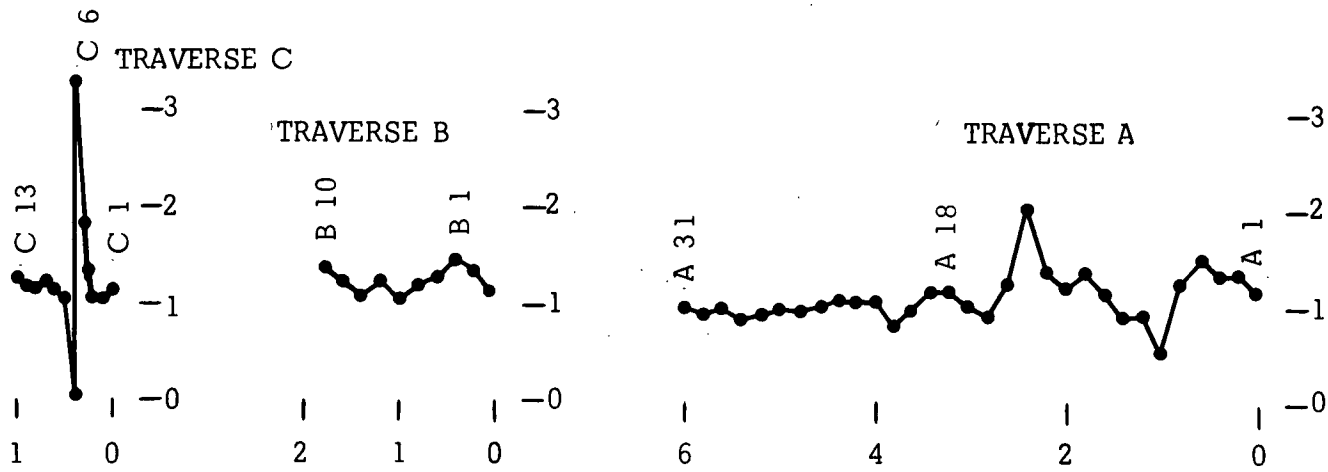
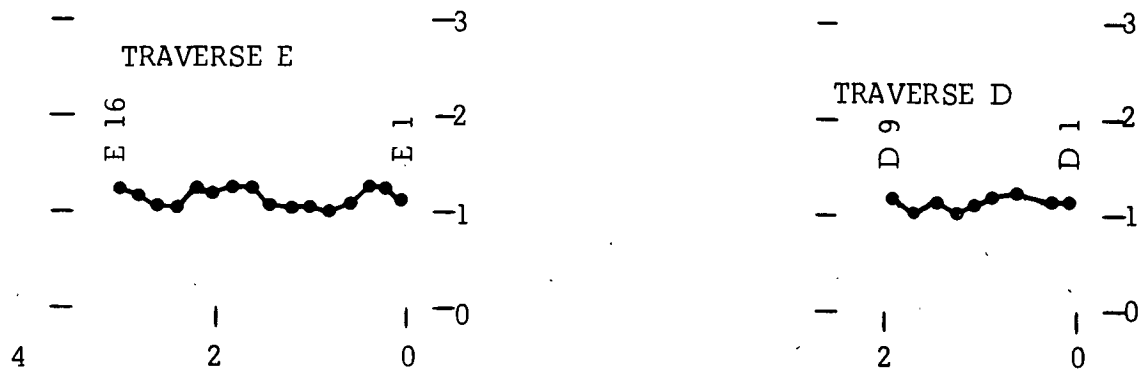
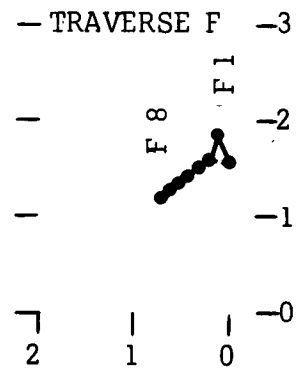




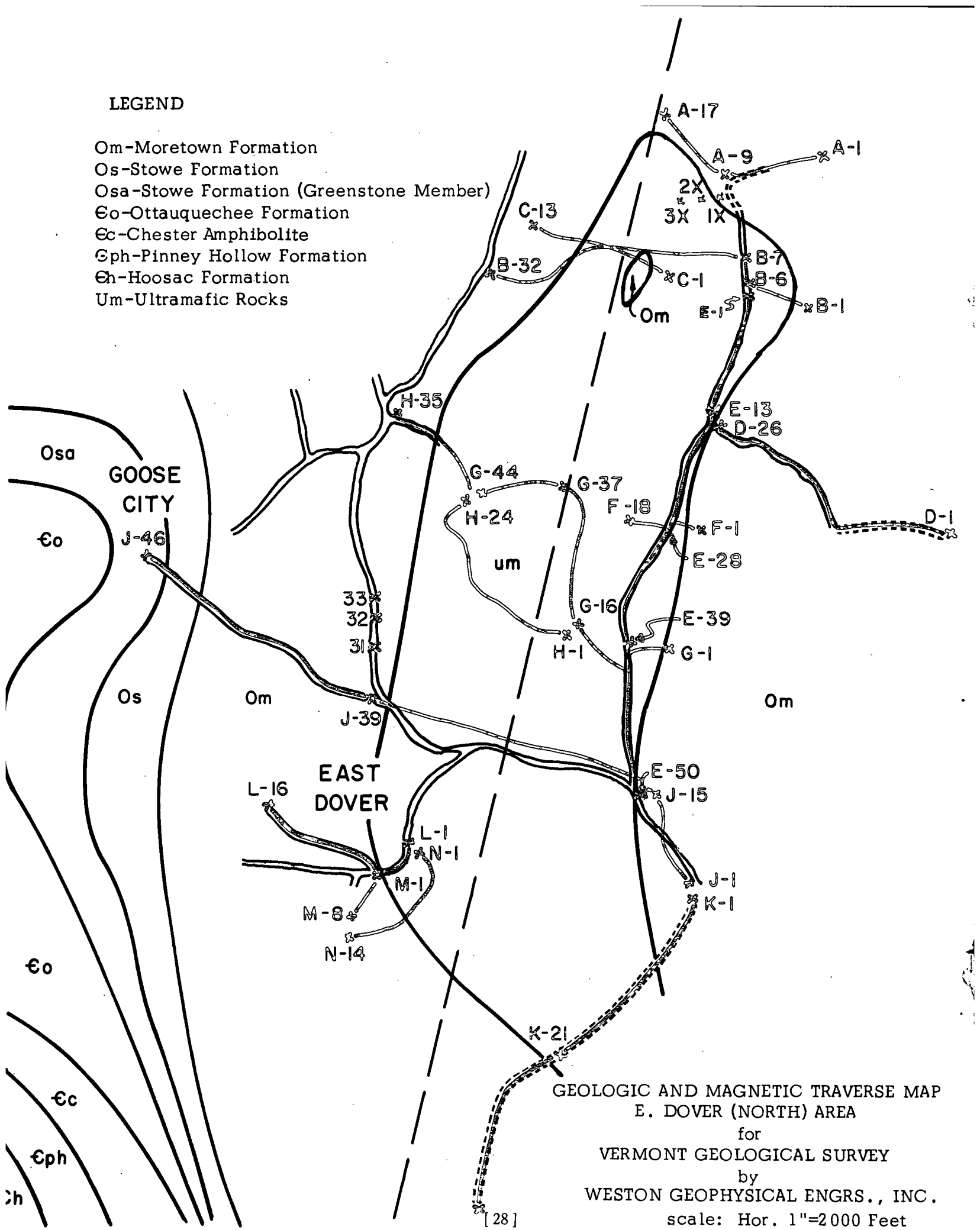


MAGNETIC PROFILE SECTIONS
E. DOVER (SOUTH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

E. DOVER(SOUTH) AREA

TRAVERSES A, B, C, D, E

STATION	GAMMAS	STATION	GAMMAS
A- 1	1130	3	1050
2	1370	4	1340
3	1370	5	1850
4	1540	6	3300
5	1250	7	10
6	510	8	1090
7	930	9	1130
8	900	10	1250
9	1180	11	1200
10	1360	12	1200
11	1200	C-13	1230
12	1360	F - 1	1510
13	2060	2	1890
14	1240	3	1550
15	900	4	1460
16	980	5	1390
17	1190	6	1350
A- 18	1130	7	1280
19	970	F- 8	1200
20	770	D- 1	1140
21	1060	2	1105
22	1045	3	1240
23	1020	4	1200
24	1000	5	1100
25	940	6	1040
26	950	7	1130
27	900	8	1080
28	890	D- 9	1190
29	935	E- 1	1120
30	920	2	1220
A- 31	945	3	1280
B- 1	1170	4	1080
2	1360	5	1010
3	1490	6	1040
4	1270	7	1010
5	1210	8	1030
6	1060	9	1230
7	1280	10	1250
8	1100	11	1180
9	1230	12	1220
B- 10	1370	13	1060
C- 1	1135	14	1060
2	1080	15	1160
		E- 16	1200



GEOLOGIC AND MAGNETIC TRAVERSE MAP
E. DOVER (NORTH) AREA
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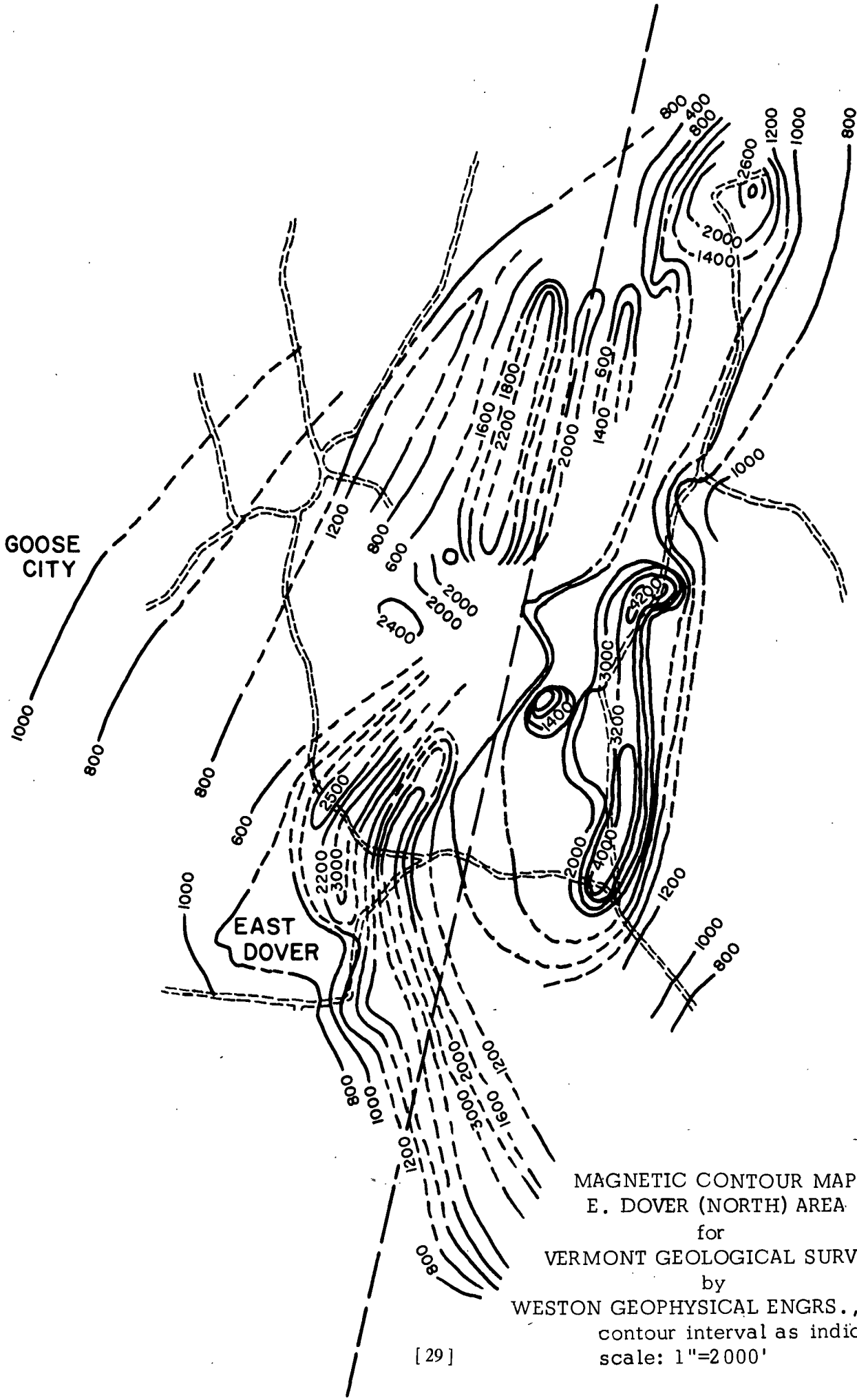
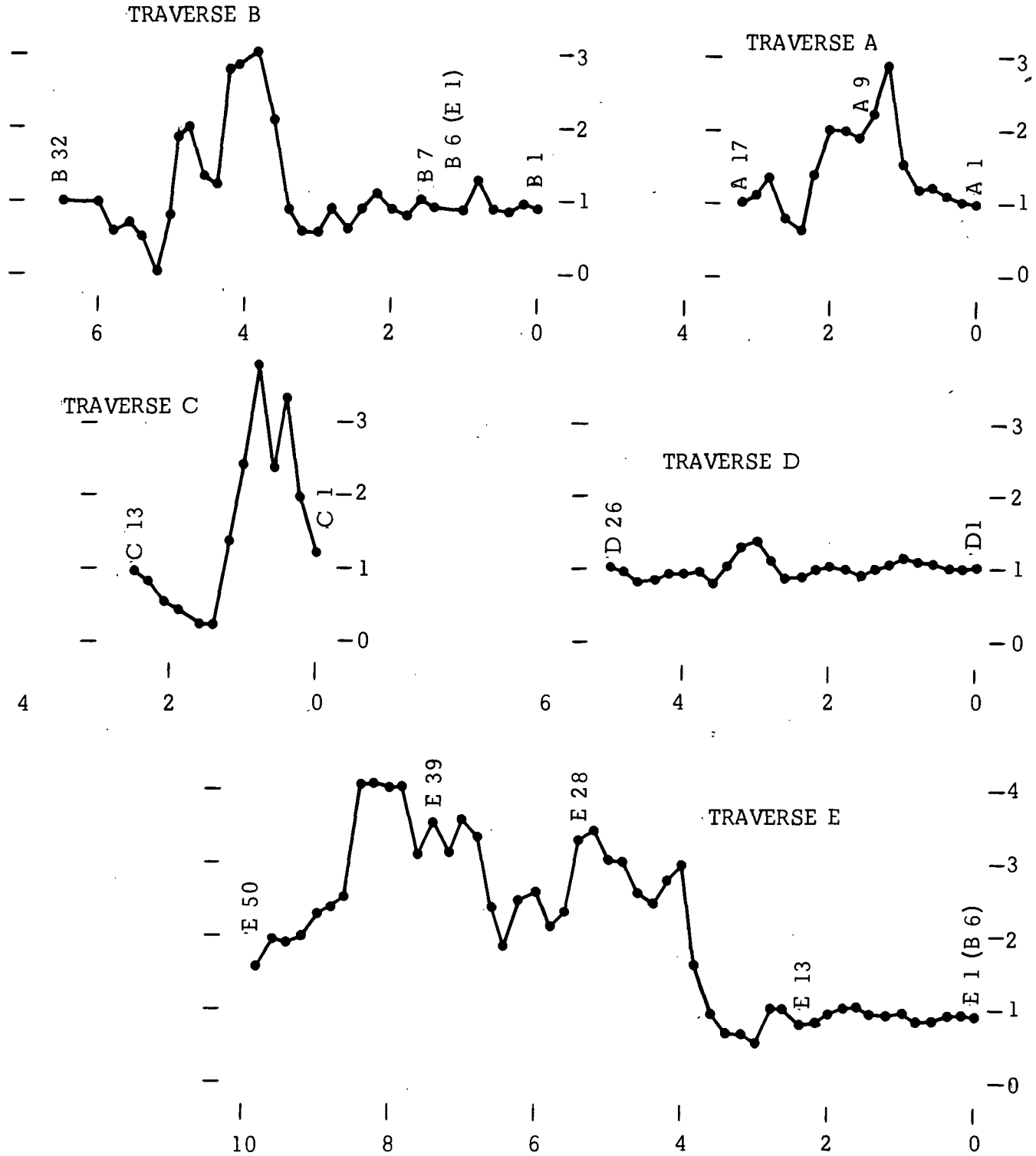
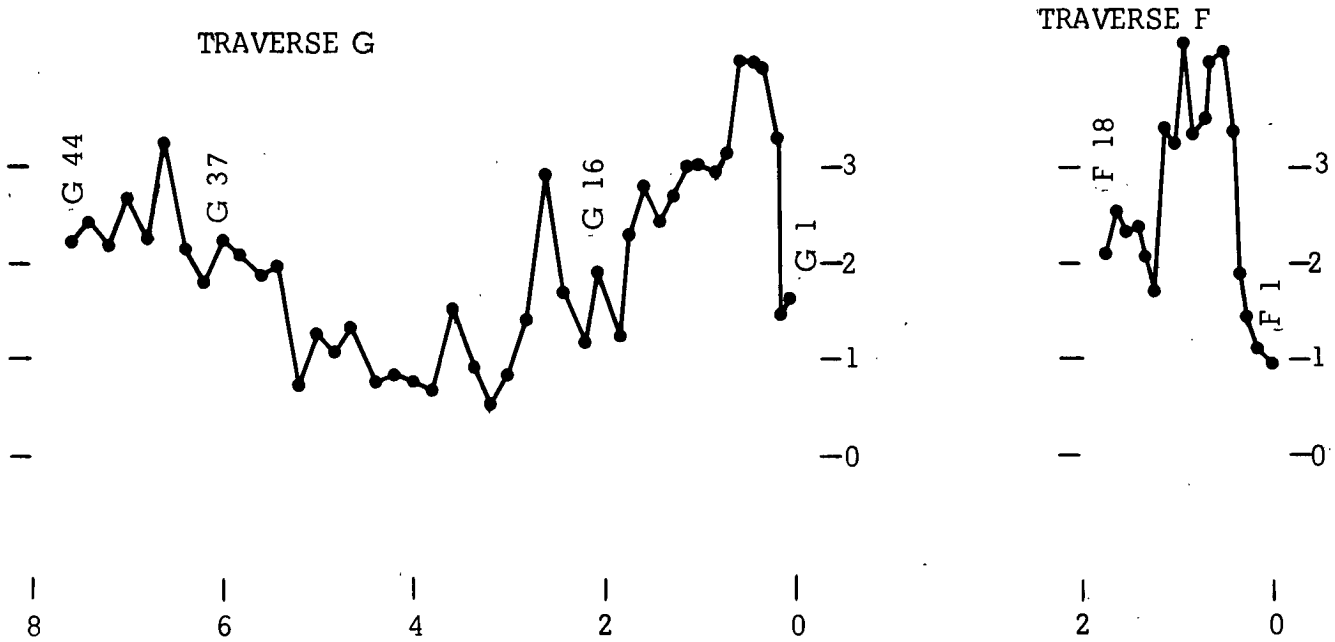
WESTON GEOPHYSICAL ENGRS., INC.
scale: Hor. 1"=2000 Feet

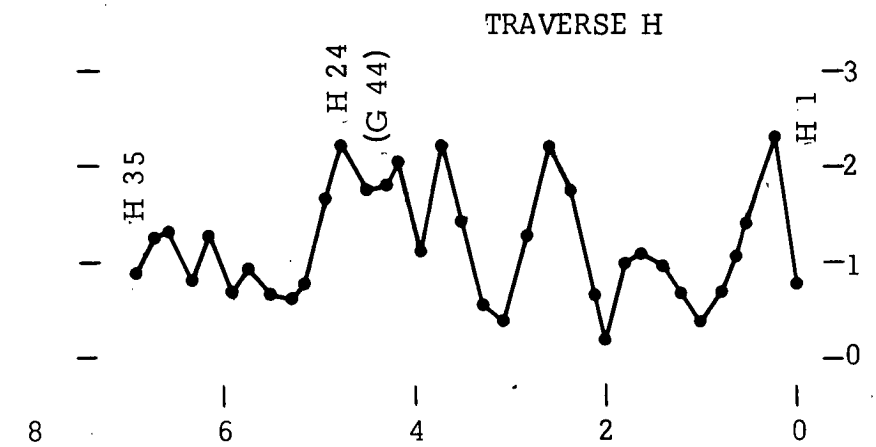


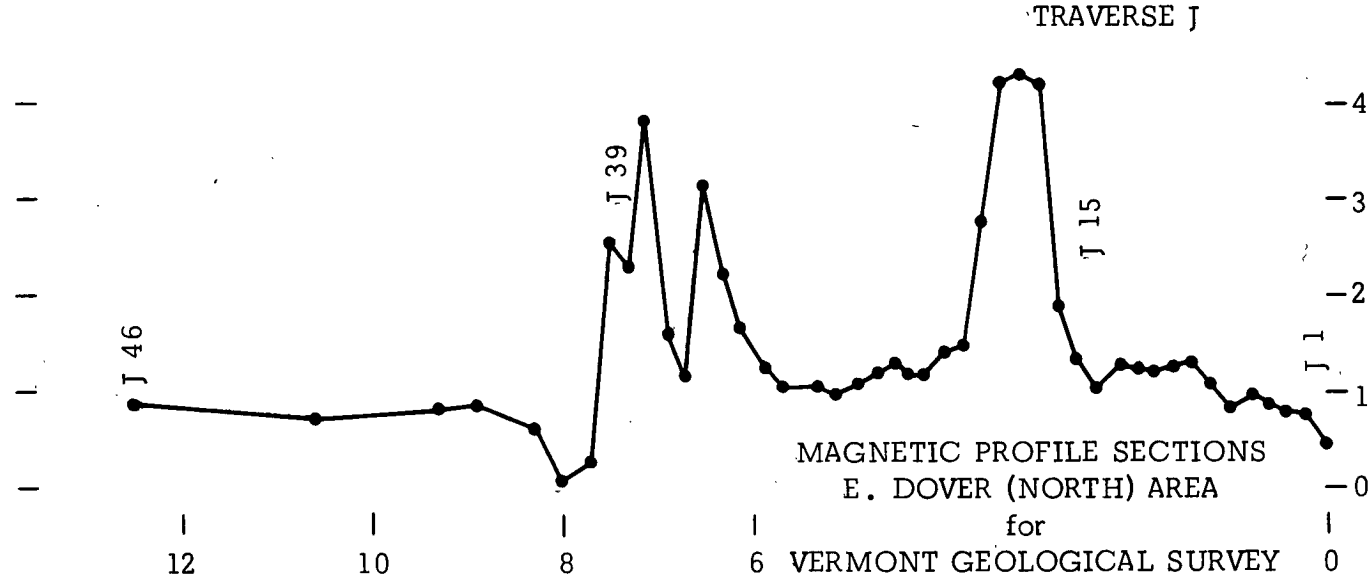
MAGNETIC CONTOUR MAP
E. DOVER (NORTH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
contour interval as indicated
scale: 1"=2000'



MAGNETIC PROFILE SECTIONS
E. DOVER (NORTH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet







MAGNETIC PROFILE SECTIONS
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VERMONT GEOLOGICAL SURVEY
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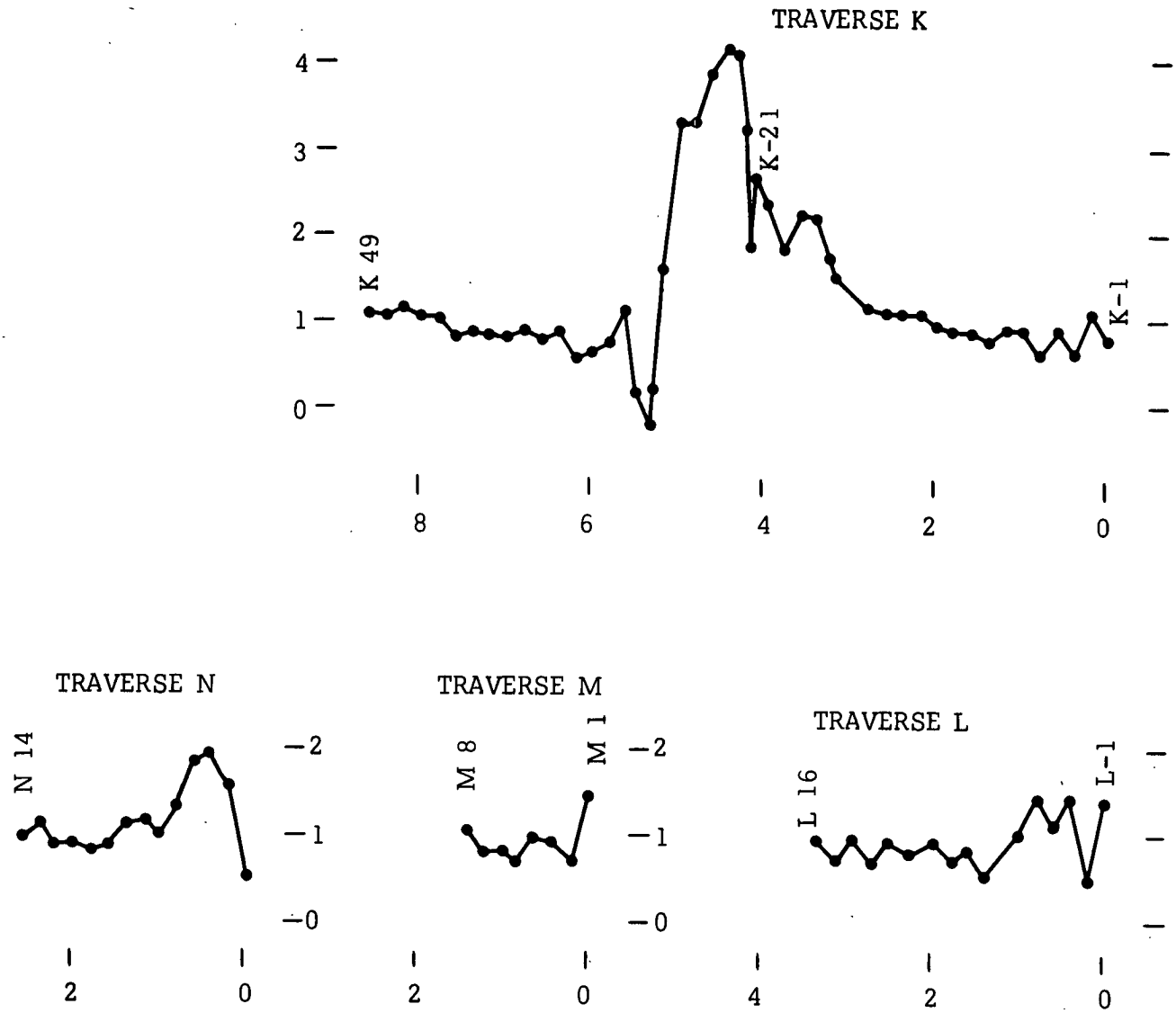
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet



MAGNETIC PROFILE SECTIONS
E. DOVER (NORTH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

E. DOVER (NORTH) AREA

TRAVERSES A, B, C

STATION	GAMMAS	STATION	GAMMAS
A-1	1020	14	960
2	1070	15	610
3	1140	16	660
4	1270	17	990
5	1200	18	2170
6	1550	19	3100
7	2920	20	2900
8	2290	21	2880
A-9	1940	22	1350
10	2070	23	1460
11	2010	24	2040
12	1410	25	1900
13	630	26	820
14	830	27	80
15	1380	28	550
16	1100	29	770
A-17	1060	30	625
1x	1870	31	1030
2x	2480	B- 32	1040
3x	3180	C- 1	1250
B- 1	950	2	1990
2	1000	3	3370
3	900	4	2350
4	940	5	3800
5	1370	6	2420
6	920	7	1320
B- 7	950	8	240
8	1060	9	290
9	860	10	470
10	980	11	570
11	1170	12	850
12	960	C-13	990
13	660		

E. DOVER (NORTH) AREA

TRAVERSE D, E

STATION	GAMMAS	STATION	GAMMAS
D-1	1045	E-13	800
2	1060	14	1030
3	1070	15	1020
4	1100	16	510
5	1130	17	700
6	1200	18	710
7	1100	19	980
8	1025	20	1620
9	950	21	3000
10	1025	22	2800
11	1040	23	2420
12	1010	24	2600
13	920	25	3050
14	920	26	3080
15	1240	27	3500
16	1430	E-28	3370
17	1330	29	2370
18	1050	30	2170
19	810	31	2610
20	990	32	2500
21	935	33	1850
22	905	34	2360
23	885	35	3370
24	880	36	3640
25	990	37	3140
D-26	1060	38	3579
E- 1	920	E-39	3110
2	930	40	4050
3	920	41	4050
4	880	42	4100
5	880	43	4100
6	990	44	2560
7	950	45	2470
8	950	46	2300
9	1060	47	2000
10	1020	48	1910
11	920	49	1950
12	870	E-50	1600

E. DOVER (NORTH) AREA

TRAVERSES F & G

STATION	GAMMAS	STATION	GAMMAS
F-1	980	14	2250
2	1100	15	1250
3	1410	G-16	1940
4	1890	17	1180
5	3230	18	1680
6	4200	19	2910
7	4100	20	1370
8	3440	21	760
9	3230	22	450
10	4300	23	1000
11	3170	24	1590
12	3440	25	690
13	1640	26	725
14	2180	27	820
15	2390	28	760
16	2330	29	1345
17	2570	30	1100
F-18	2010	31	1300
G-1	1675	32	700
2	1410	33	1980
3	3250	34	1820
4	4050	35	2050
5	4050	36	2280
6	4200	G-37	1790
7	3030	38	2140
8	2920	39	3240
9	3030	40	2260
10	3040	41	2640
11	2770	42	2160
12	2460	43	2420
13	2820	G-44	2200

E. DOVER (NORTH) AREA

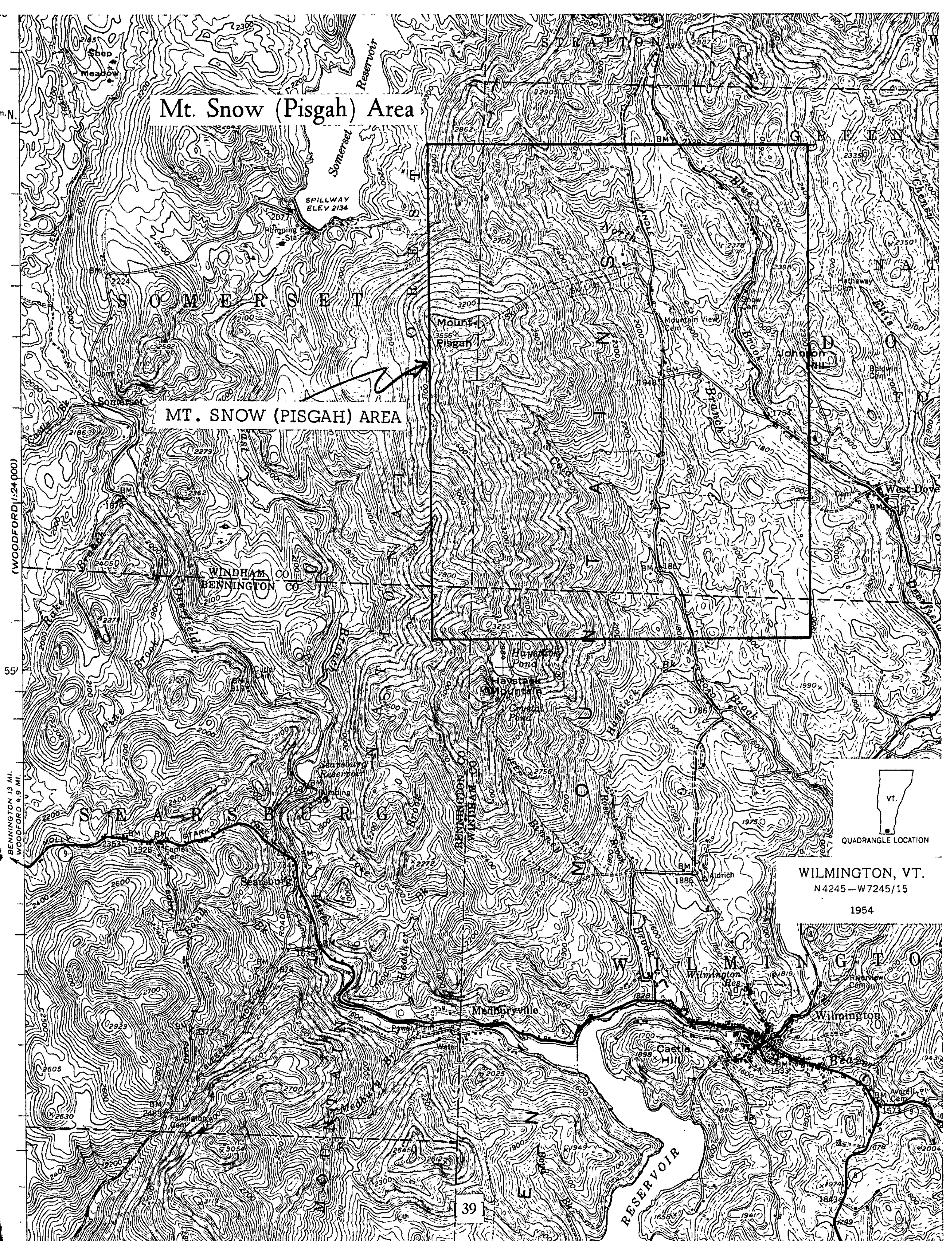
TRAVERSE H, J

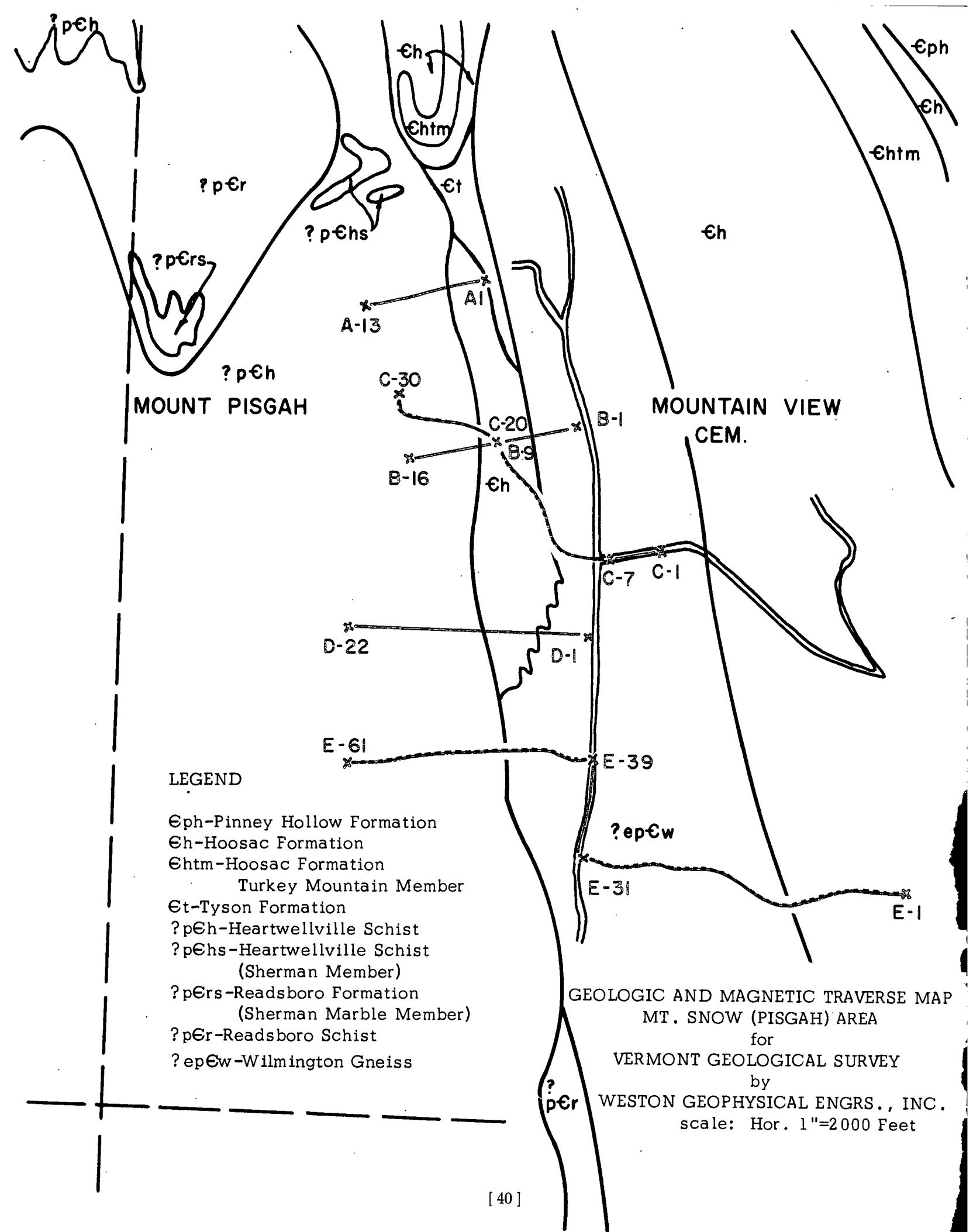
STATION	GAMMAS
H- 1	750
2	2330
3	1350
4	1005
5	650
6	340
7	640
8	970
9	1060
10	960
11	0
12	580
13	1980
14	2240
15	1220
16	360
17	520
18	1550
19	2250
20	1025
21	2020
22	1800
23	1740
H- 24	2270
25	1690
26	770
27	600
28	670
29	970
30	640
31	1320
32	750
33	1310
34	1210
H- 35	840
J- 1	460
2	790
3	750
4	890
5	920
6	800
7	1020
8	1300
9	1210
10	1200
11	1210
12	1240
13	1015
14	1330
J- 15	1865
16	4200
17	4300
18	4200
19	2770
20	1405
21	1365
22	1150
23	1200
24	1280
25	1160
26	1080
27	990
28	1020
29	1000
30	1045
31	1270
32	1680
33	2210
34	3130
35	1010
36	1565
37	3800
38	2270
J - 39	2590
40	200
41	0
42	640
43	890
44	840
45	720
J- 46	860
31	450
32	840
33	860

E. DOVER (NORTH) AREA

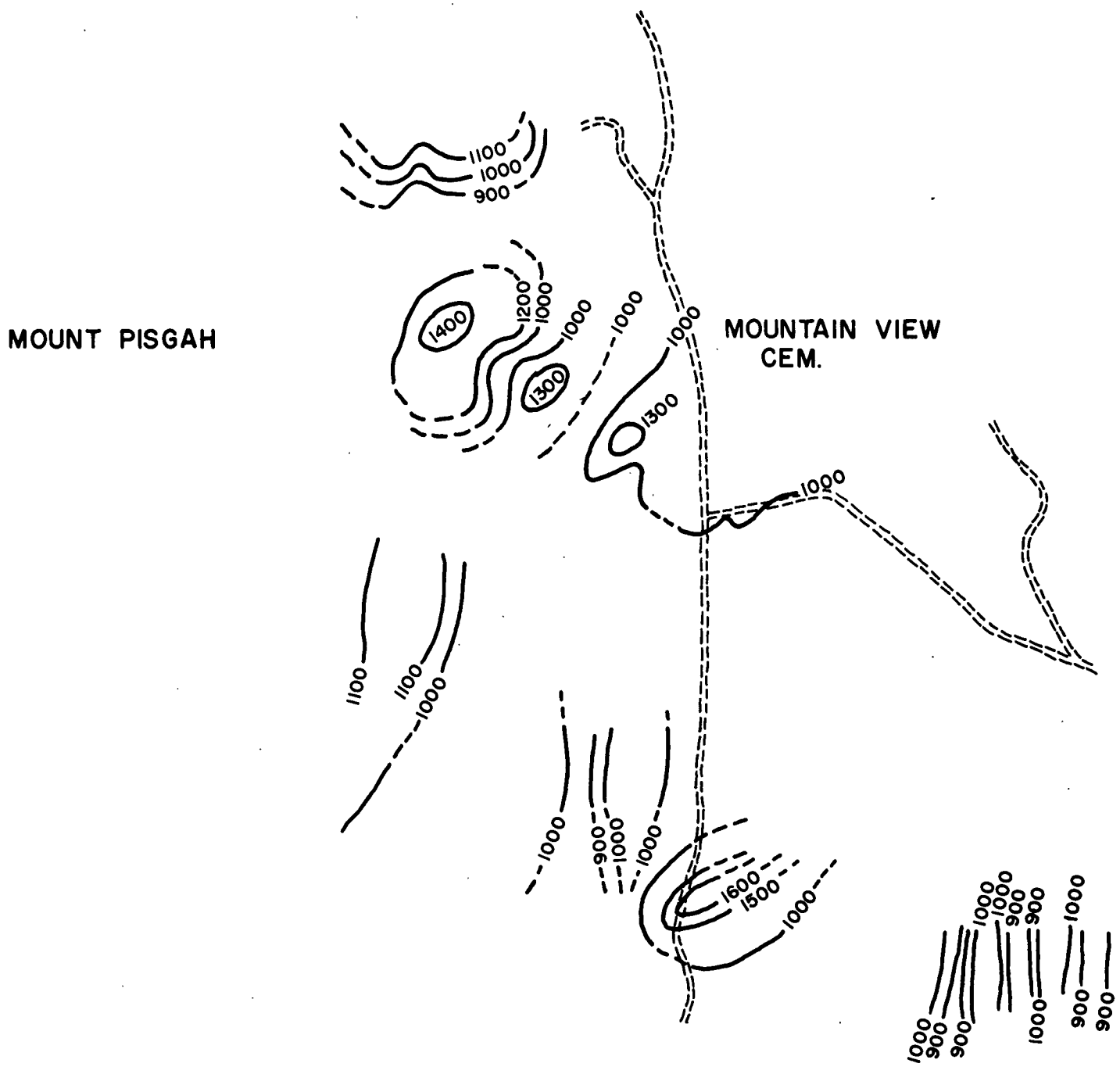
TRAVERSE K, L, M, N

STATION	GAMMAS
K- 1	860
2	1140
3	650
4	950
5	680
6	940
7	970
8	820
9	910
10	930
11	1030
12	1120
13	1110
14	1110
15	1190
16	1330
17	1580
18	2220
19	2240
20	1840
K-21	2400
22	2730
23	1910
24	3270
25	4100
26	4200
27	3900
28	3320
29	3370
30	1610
31	200
32	0
33	170
34	1140
35	780
36	690
37	590
38	880
39	820
40	890
41	820
42	840
43	850
44	810
45	1050
46	1040
47	1150
48	1090
49	1090
L- 1	1450
2	500
3	1530
4	1150
5	1520
6	1070
7	600
8	850
9	780
10	980
11	890
12	960
13	780
14	1020
15	790
L- 16	1000
M- 1	1550
2	720
3	960
4	1025
5	700
6	860
7	850
M- 8	1060
N- 1	570
2	1590
3	1980
4	1870
5	1340
6	1000
7	1200
8	1160
9	890
10	810
11	905
12	950
13	1140
N- 14	1000

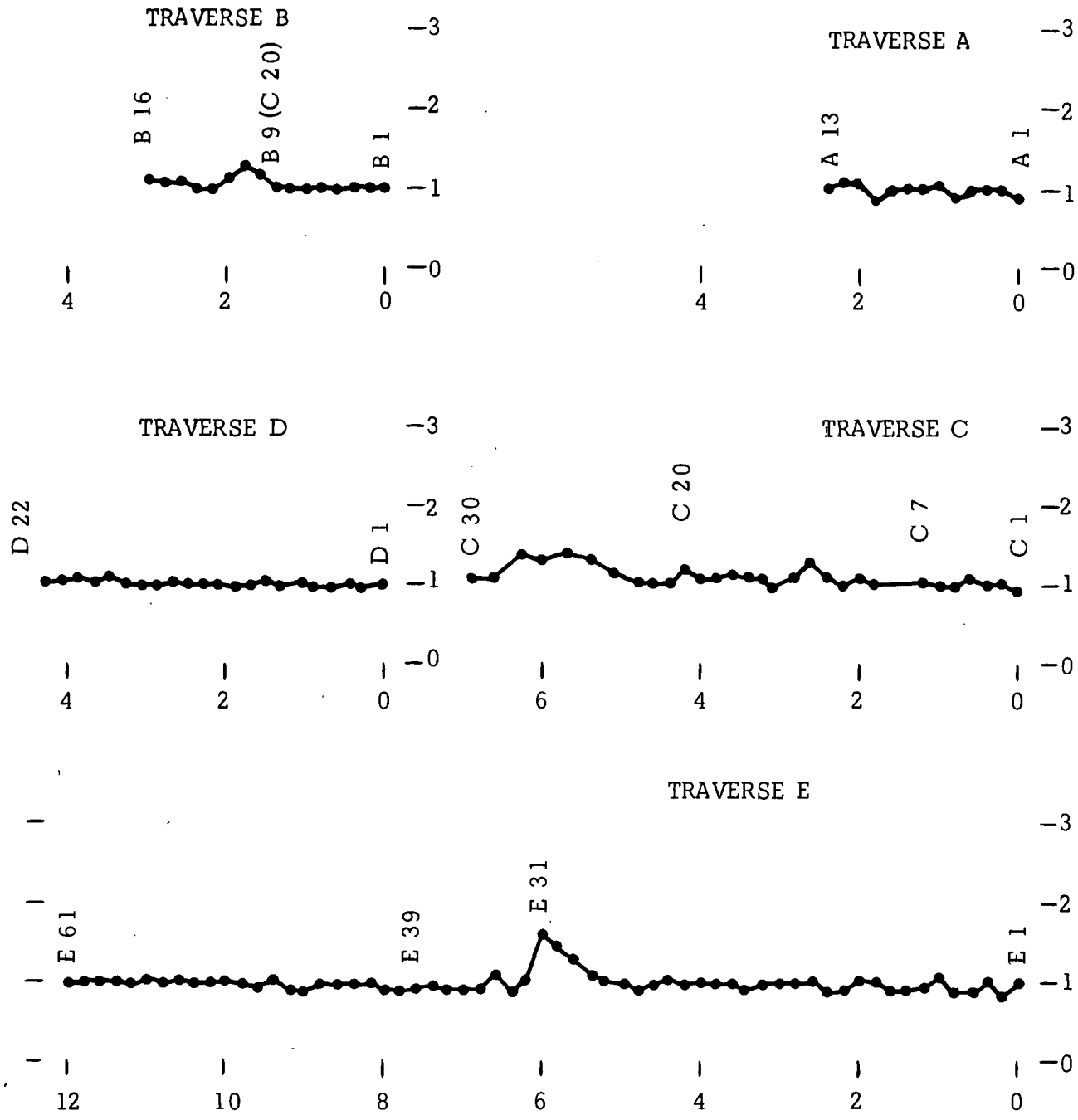

Mt. Snow (Pisgah) Area
MT. SNOW (PISGAH) AREA
WILMINGTON, VT.
N4245—W7245/15
1954
QUADRANGLE LOCATION
VT.
SOMERSET
SEARSBURG
WILMINGTON
STRATTON
GREEN MOUNTAIN NATIONAL FOREST
Somerset Reservoir
SPILLWAY ELEV 2134
Pumping Sta
Somerset
Mount Pisgah
3556
Haystack Mountain
Haystack Pond
Crystal Pond
Searsburg Reservoir
Searsburg
Medburyville
Power Plant
Castle Hill
Wilmington
West Dover
Johnson Hill
Aldrich
WINDHAM CO
BENNINGTON CO
(WOODFORD 1:24 000)
BENNINGTON 13 MI.
WOODFORD 4.9 MI.
RESERVOIR
Deerfield
North Branch
Cold Brook
Blue Brook
Haystack Bk
Heather Bk
Medburg Bk
55′



GEOLOGIC AND MAGNETIC TRAVERSE MAP
MT. SNOW (PISGAH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Hor. 1"=2000 Feet



MAGNETIC CONTOUR MAP
MT. SNOW (PISGAH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
contour interval as indicated
scale: 1"=2000'



MAGNETIC PROFILE SECTIONS
MT. SNOW (PISGAH) AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

MT. SNOW (PISGAH) AREA

TRAVERSES A, B & C

STATION	GAMMAS	STATION	GAMMAS
A- 1	950	C- 1	980
2	1060	2	1040
3	1040	3	1060
4	1010	4	1120
5	1000	5	1030
6	1070	6	1080
7	1070	C-7	1100
8	1030	8	1080
9	1015	9	1100
10	970	10	1070
11	1130	11	1150
12	1130	12	1350
A- 13	1080	13	1150
B- 1	1050	14	1030
2	1040	15	1120
3	1060	16	1120
4	1060	17	1120
5	1050	18	1120
6	1070	19	1110
7	1085	C-20	1220
8	1060	21	1070
B- 9	1240	22	1080
10	1350	23	1070
11	1175	24	1200
12	1050	25	1380
13	1090	26	1460
14	1135	27	1360
15	1110	28	1410
B-16	1140	29	1115
		C-30	1125

MT. SNOW (PISGAH) AREA

TRAVERSES D & E

STATION	GAMMAS	STATION	GAMMAS
D-1	1020	18	990
2	1000	19	1050
3	1030	20	1035
4	1000	21	1030
5	1050	22	1000
6	1030	23	1080
7	1050	24	1020
8	1065	25	975
9	1055	26	1010
10	1050	27	1070
11	1060	28	1130
12	1070	29	1330
13	1075	30	1510
14	1070	E-31	1610
15	1050	32	1025
16	1060	33	990
17	1080	34	1110
18	1110	35	970
19	1100	36	990
20	1110	37	990
21	1100	38	1000
D-22	1100	E-39	980
E- 1	1070	40	980
2	870	41	980
3	1080	42	1010
4	925	43	1015
5	940	44	1000
6	1130	45	1010
7	950	46	910
8	970	47	950
9	970	48	1035
10	1050	49	1000
11	1070	50	1040
12	950	51	1050
13	940	52	1030
14	1040	53	1030
15	1020	54	1050
16	1035	55	1040
17	1030	56	1060
		57	1010
		58	1090
		59	1070
		60	1060
		E-61	1050

REPORT ON MAGNETIC SURVEY IN THE LUDLOW AREA WINDSOR COUNTY, VERMONT

By

VINCENT J. MURPHY

WESTON GEOPHYSICAL ENGINEERS, INC.

Introduction

During September, 1962, a magnetic survey was conducted in the vicinity of Dover, Vermont, for the Vermont Geological Survey. In that study magnetic traverses were made over a large ultramafic rock mass and adjacent rocks.

A similar but somewhat smaller area of ultramafic rock exists in the vicinity of Ludlow, Vermont. Dr. Charles G. Doll, Vermont State Geologist, in company with Mr. Vincent J. Murphy of Weston Geophysical Engineers, Inc., examined this area and found that a magnetic survey was practicable.

Method of Study

The magnetic method adopted for the Ludlow area is identical to the method used in the Dover area and described in that report.

In both of these studies, relative values of magnetic intensity were obtained, with the base magnetic level nearly the same in each. This closely corresponding magnetic level will facilitate comparison of data, as both sets of data can be used either independently or together. Virtually all of the statements in the Dover report are applicable to the Ludlow area. A few of the more pertinent ones are included as follows:

> ". . . Highly anomalous readings are obtained wherever a concentration of magnetic minerals exists. If the magnetic anomalies extend over a wide area, or if they can be traced for great longitudinal distances, a body of possible economic value is indicated.
>
> "The magnetic minerals are often of too small a quantity to have economic value, but they are in many instances associated with other minerals that are of value. The magnetic minerals therefore serve as indicators, and are readily detectable."

Locations of Magnetic Stations

A few stations could be located along roads and other prominent features, but because of wooded terrain most stations had to be located by compass and pacing. Although not as accurately located as by transit and tape survey, the locations are considered to be adequate for the study.

Approximately 256 stations were occupied and were spaced 200 feet apart generally.

Results of the Survey

The area studied is located approximately in the center of the Ludlow, Vermont, quadrangle. This map-area was enlarged two and one half times and the magnetic traverses plotted upon it. The locations of two or more major stations for each traverse are indicated on the maps. The remaining stations for each traverse can be located readily by use of the traverse map and by scaling the spacing of points shown on the magnetic profile for each traverse.

Magnetic station values for each traverse are plotted on the graph sections accompanying the report. Tabula-

tions of these values are also included in this report in the event that a specific need for them arises.

Presentation of Data

Magnetic profiles along the traverses and a magnetic contour map for the entire area are included with this report. In evaluating the data it should be realized that where the density of stations and traverses is greatest the more accurate is the magnetic contour map.

Because of the very erratic readings in a few locations, the contouring had to be generalized. Inspection of the profiles will indicate the areas where the magnetic intensity varies greatly and in short distances. These areas, of necessity, had to be generalized on the magnetic contour map.

Correlations with Known Geology

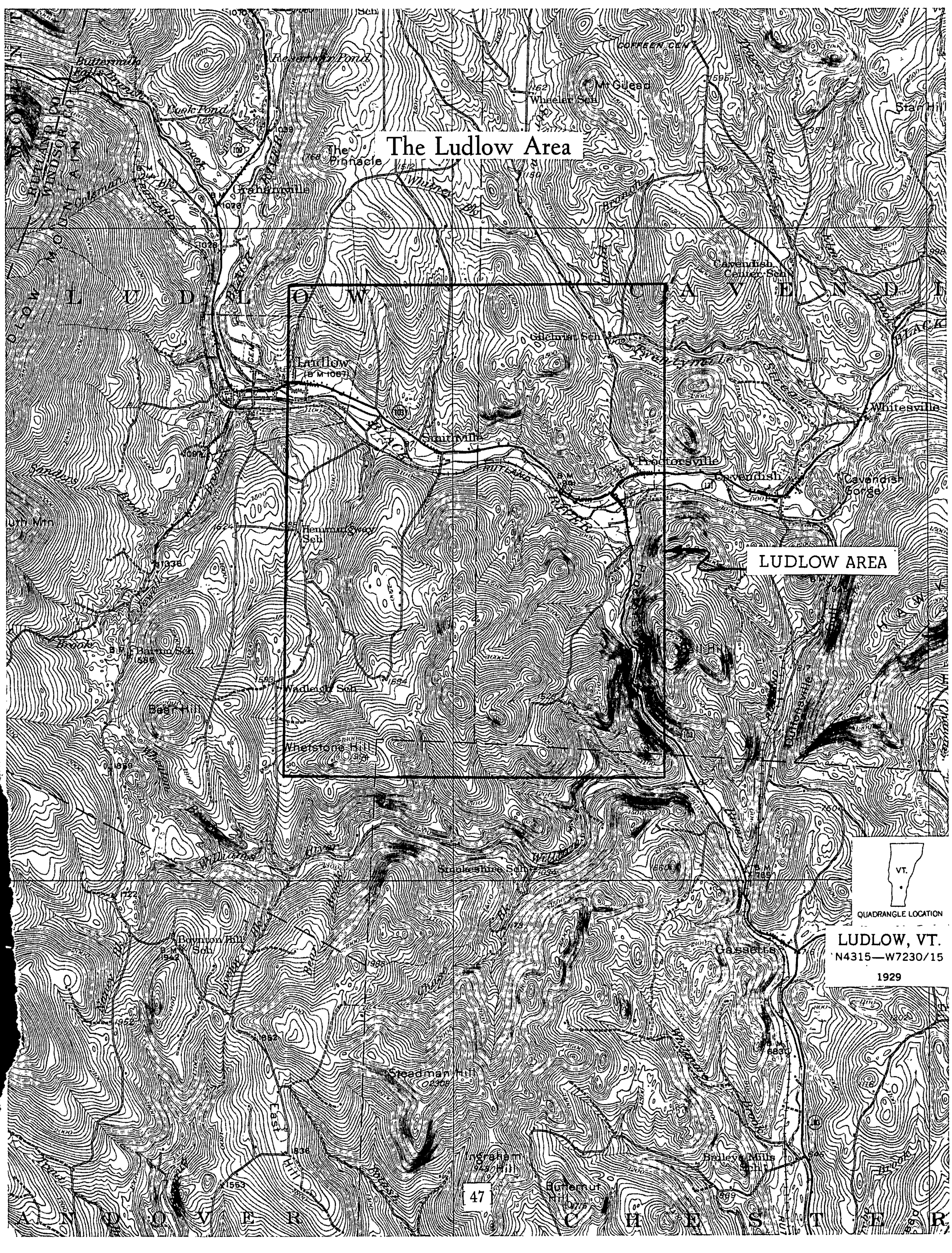
The causes of magnetic anomalies are concentrations of magnetic minerals. These exist within the ultramafic rock mass and possibly within other related rocks. The geology of the Ludlow area is described in "A Gneiss Dome in Southeastern Vermont" by James B. Thompson, Jr.: Ph.D. thesis, Massachusetts Institute of Technology, 1950.

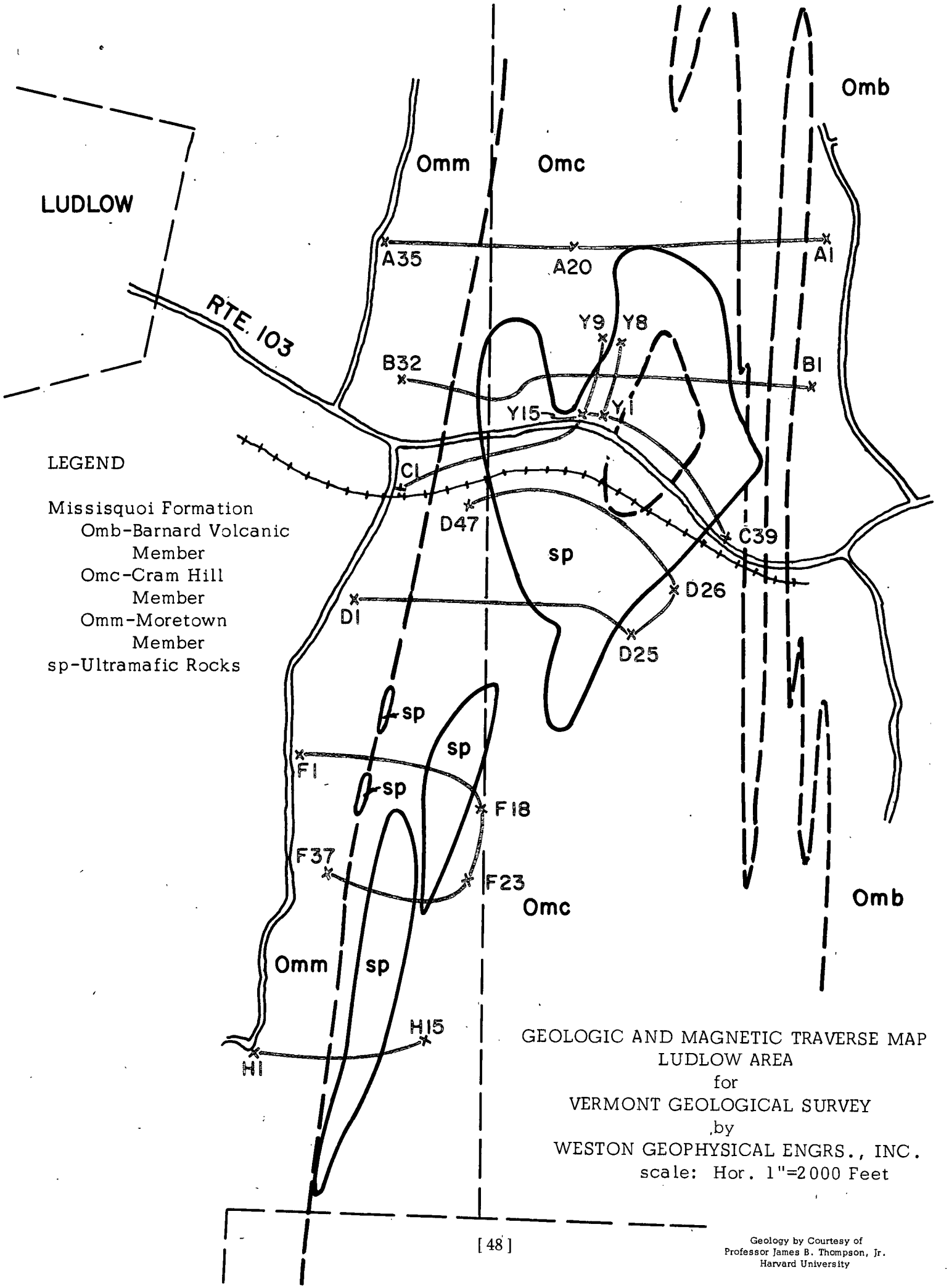
The pattern of the anomalies is similar to that detected in the Dover area. It exists in the Ludlow area in a more erratic manner, however, and could not be as well defined. Its existence is definite and further exploration by drilling would serve to determine the economic value of associated minerals.

Economic Possibilities and Recommendations

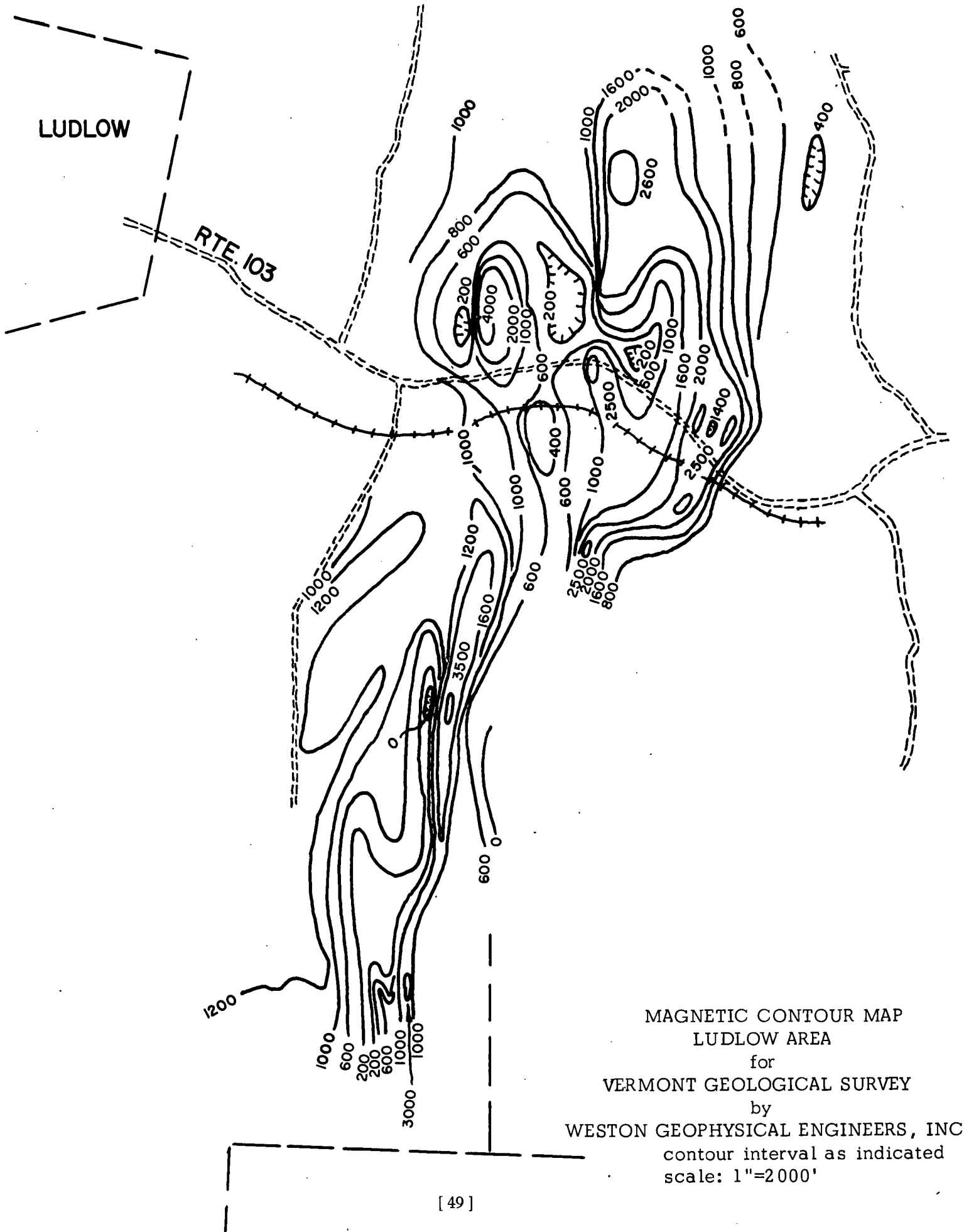
The largest and best defined anomalies are, of course, the areas of greatest interest. Particularly strong anomalies are located 1,000 feet north of Highway #103, between stations B22 and B28, and about one mile south of Highway #103, between stations F12 and F15.

The pattern of test drilling should be perpendicular to the trend of an anomaly. This procedure will best determine the types of minerals causing the anomalies and should establish the economic value of associated minerals.

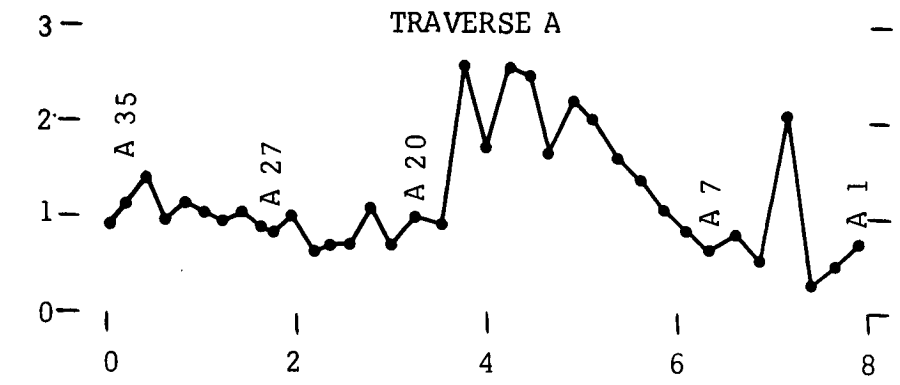

The Ludlow Area
LUDLOW AREA
LUDLOW, VT.
N4315—W7230/15
1929
VT.
QUADRANGLE LOCATION
L U D L O W
C A V E N D I
A N D O V E R
C H E S T E R
Ludlow
(B M 1067)
Smithville
Proctorsville
Cavendish
Cavendish Gorge
Whitesville
Cavendish Center Sch
Gilchrist Sch
Hemmenway Sch
Wadleigh Sch
Whetstone Hill
Burnm Sch
Bag Hill
Grahamville
Buttermilk Falls
Reservoir Pond
Lock Pond
The Pinnacle
Mt Gilead
Wheeler Sch
Coffeen Cem
Star Hill
Snakeshire Sch
Boynton Hill
Steadman Hill
Ingraham Hill
Butternut Hill
Baileys Mills
Gassetts
Williams River
Black River
Twenty mile
Duttonsville
East Hill

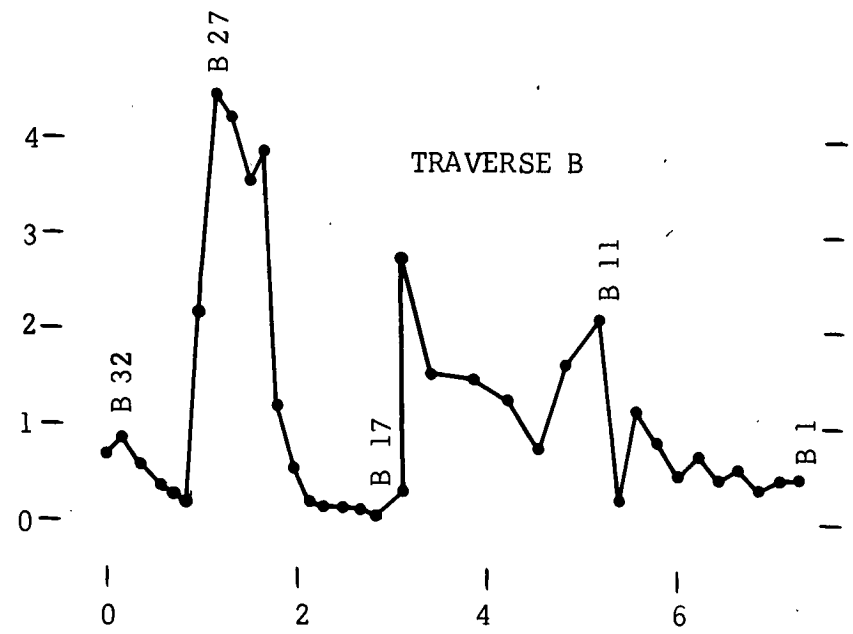


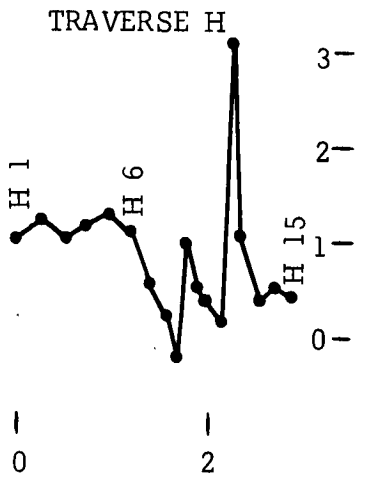
Geology by Courtesy of
Professor James B. Thompson, Jr.
Harvard University

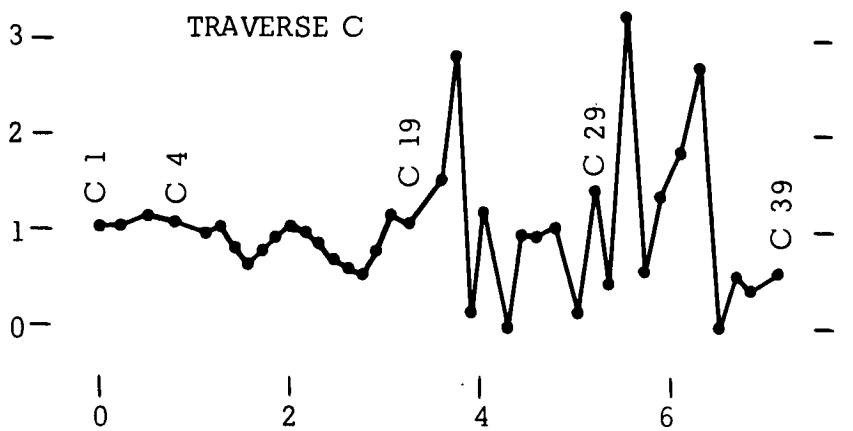


MAGNETIC CONTOUR MAP
LUDLOW AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGINEERS, INC.
contour interval as indicated
scale: 1"=2000'



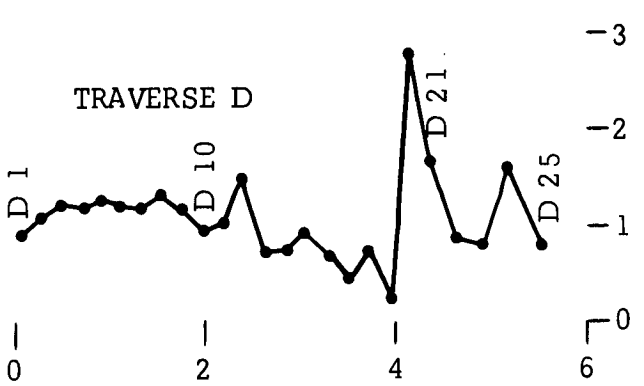


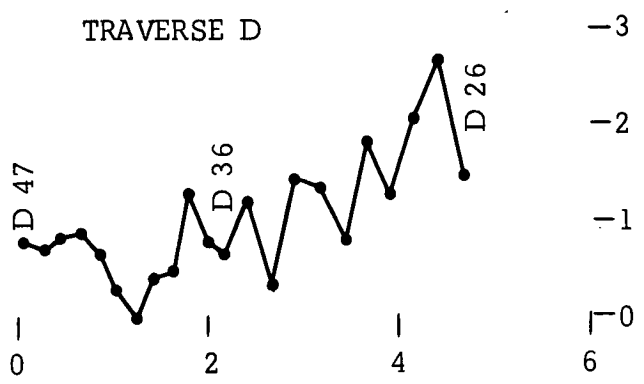


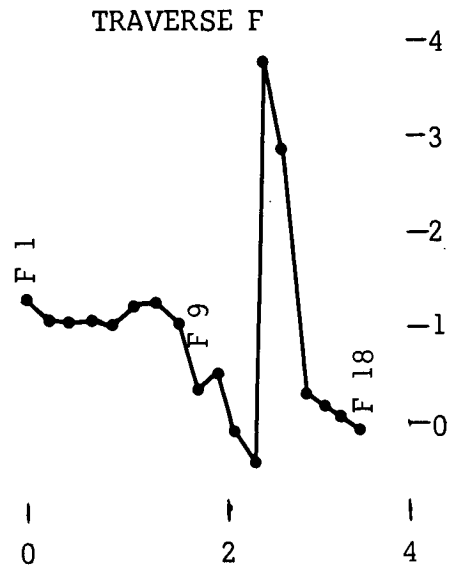


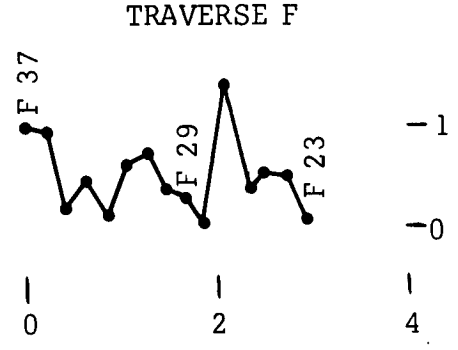
MAGNETIC PROFILE SECTIONS
LUDLOW AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGINEERS, INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

Refer to Data Tabulations for Station Sequence and Individual Station Values

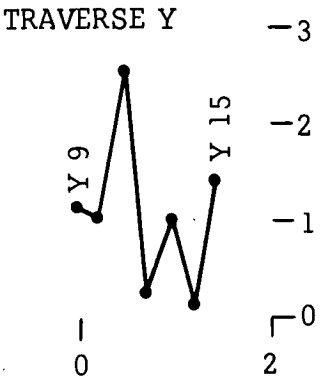


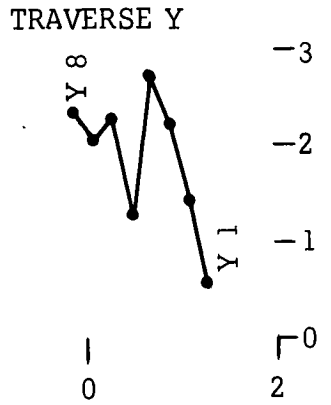


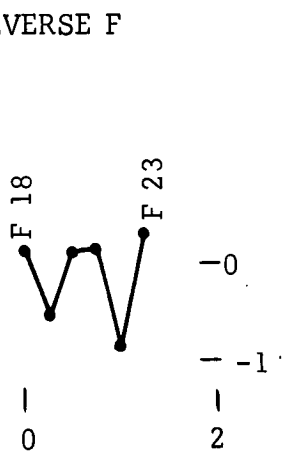




Refer to Data Tabulations for Station Sequence and Individual Station Values







MAGNETIC PROFILE SECTIONS
LUDLOW AREA
for
VERMONT GEOLOGICAL SURVEY
by
WESTON GEOPHYSICAL ENGRS., INC.
scale: Ver. 1"=2000 Gamma
Hor. 1"=2000 Feet

LUDLOW AREA

TRAVERSES A, B, C

STATION	GAMMAS	STATION	GAMMAS
A - 1	785	B - 6	722
2	582	7	492
3	339	8	881
4	2128	9	1176
5	624	10	234
6	884	11	2167
7	708	12	1629
8	928	13	719
9	1133	14	1279
10	1438	15	1492
11	1680	B - 16	1549
12	2081	Y - 11	2615
13	2297	Y - 12	350
14	1697	B - 17	57
15	2530	18	136
16	2609	19	169
17	1778	20	168
18	2618	21	217
19	940	22	525
20	1040	23	1212
21	752	24	3888
22	1129	25	3537
23	728	26	4247
24	729	27	4497
25	695	B - 27+150	2056
26	1062	28	23
27	890	29	79
28	912	30	366
29	1065	31	578
30	975	32	896
31	1058	33	704
32	1160	C - 1	1072
33	945	2	1070
34	1424	3	1150
35	1159	4	1046
36	967	5	979
B - 1	480	6	1029
2	473	7	832
3	341	8	676
4	555	9	796
5	473	10	935
		11	1046

LUDLOW AREA

TRAVERSES F, H, Y

STATION	GAMMAS	STATION	GAMMAS
F - 8	1087	10	479
9	361	11	166
10	537	11+100	3087
11	-52	12	1040
12	-431	13	387
13	3820	14	534
14	2896	15	425
15	343	Y - 1	666
16	214	2	1505
17	103	3	2315
18	-61	4	2804
19	-711	5	1385
20	-41	6	2335
21	-8	7	2143
22	-1066	8	2421
23	143	9	1282
24	604	10	1141
25	620	11	2615
26	443	12	350
27	1505	13	1174
28	63	14	230
29	352	15	1579
30	467		
31	828		
32	724		
33	183		
34	537		
35	232		
36	1020		
37	1043		
H - 1	1031		
2	1227		
3	1027		
4	1128		
5	1257		
6	1086		
7	566		
8	219		
8+100	-224		
9	966		
9+100	528		

LUDLOW AREA

TRAVERSES C, D, F

STATION	GAMMAS	STATION	GAMMAS
C-12	992	14	762
13	867	15	965
14	714	16	689
15	613	17	470
16	542	18	773
17	788	19	275
18	1143	20	2749
19	1047	21	1640
20	1514	22	842
21	2823	23	786
22	147	24	1605
23	1210	25	789
24	-36	26	1469
25	947	27	2709
26	941	28	2040
27	1008	29	1249
28	137	30	1827
29	1422	31	824
30	454	32	1378
31	3248	33	1433
32	549	34	343
33	1369	35	1215
34	1818	36	675
35	2734	37	826
36	-106	38	1337
37	557	39	485
38	399	40	419
39	586	41	-21
D-1	935	42	285
2	1102	43	660
3	1197	44	898
4	1222	45	872
5	1271	46	727
6	1227	47	779
7	1191	F-1	1310
8	1363	2	1128
9	1218	3	1116
10	995	4	1111
11	1037	5	1088
12	1487	6	1263
13	756	7	1311